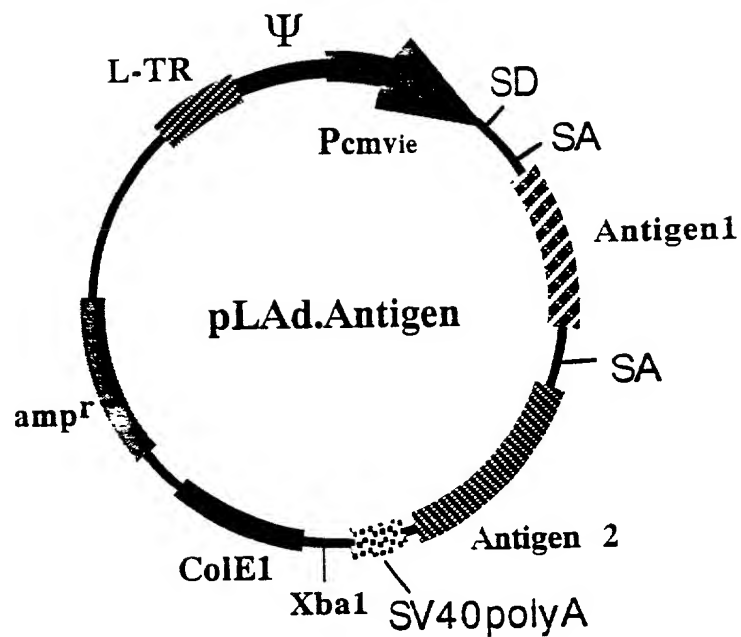
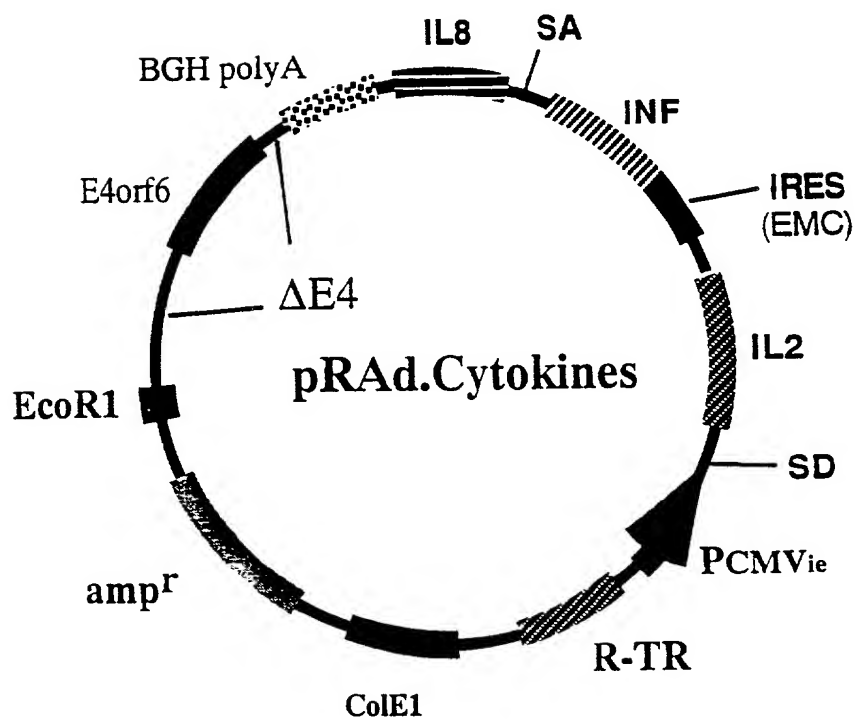


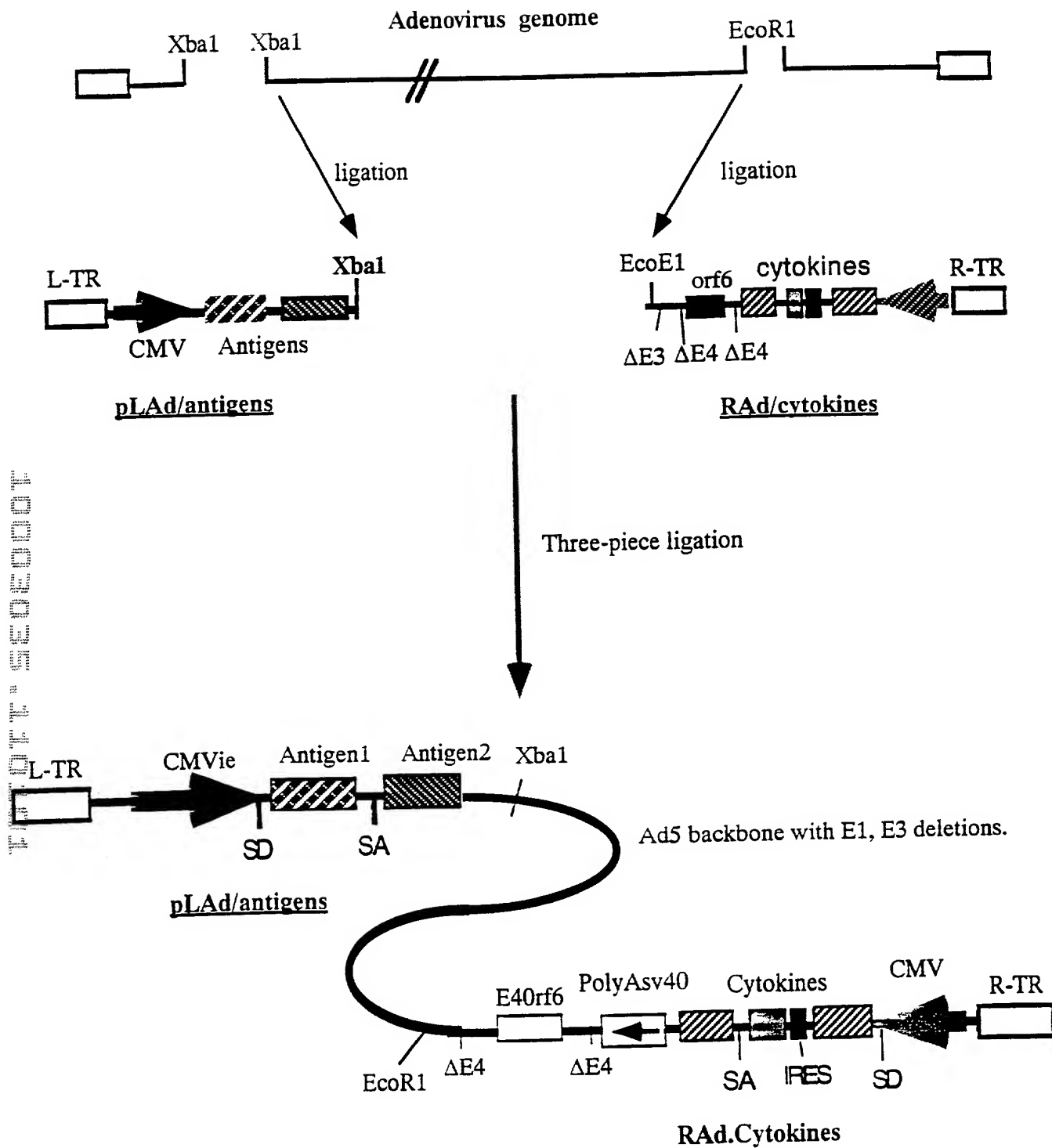
**FIGURE 1A**



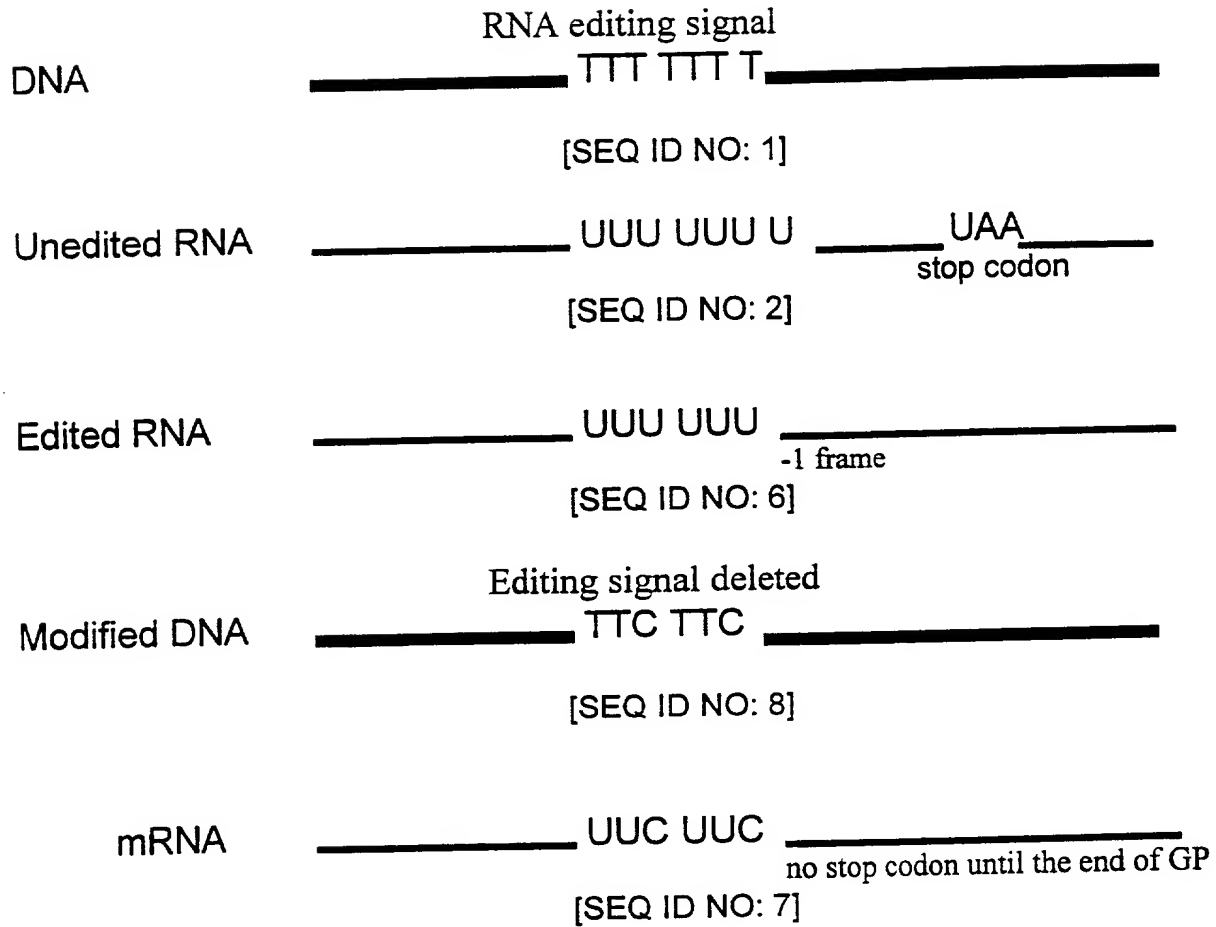
**FIGURE 1B**

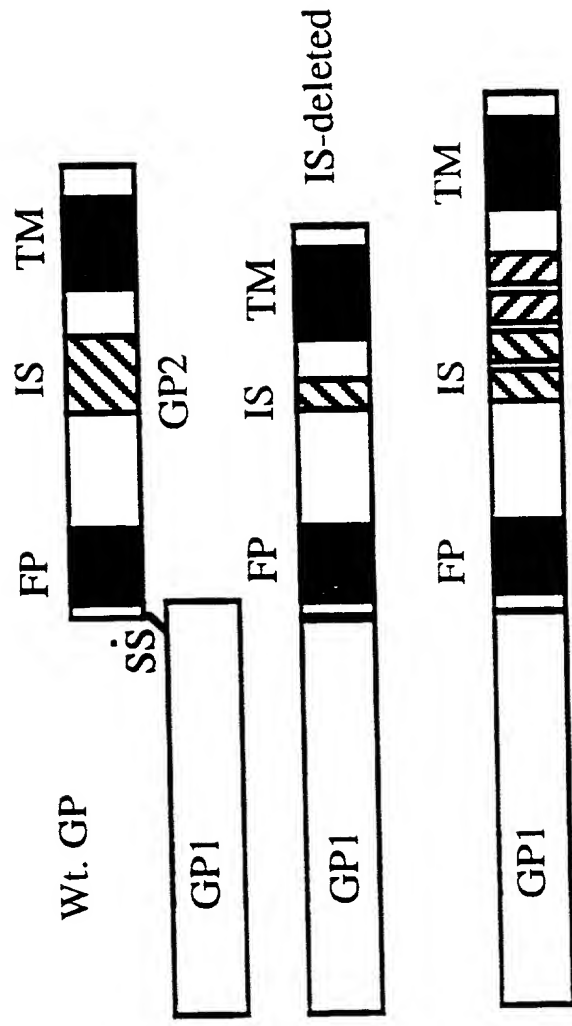


**FIGURE 1C**



**FIGURE 2**





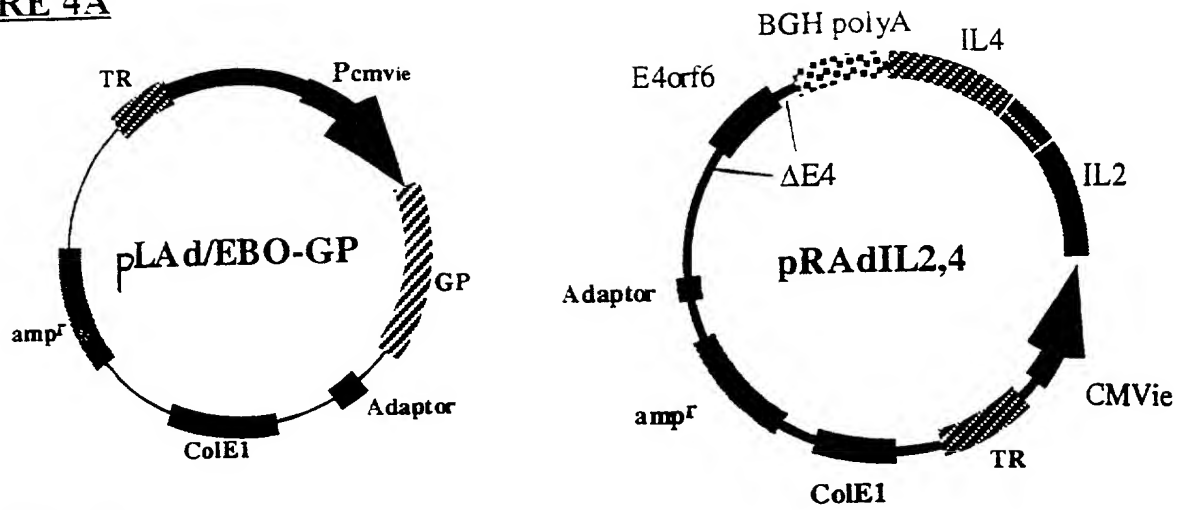
**FIGURE 3A**

**FIGURE 3B**

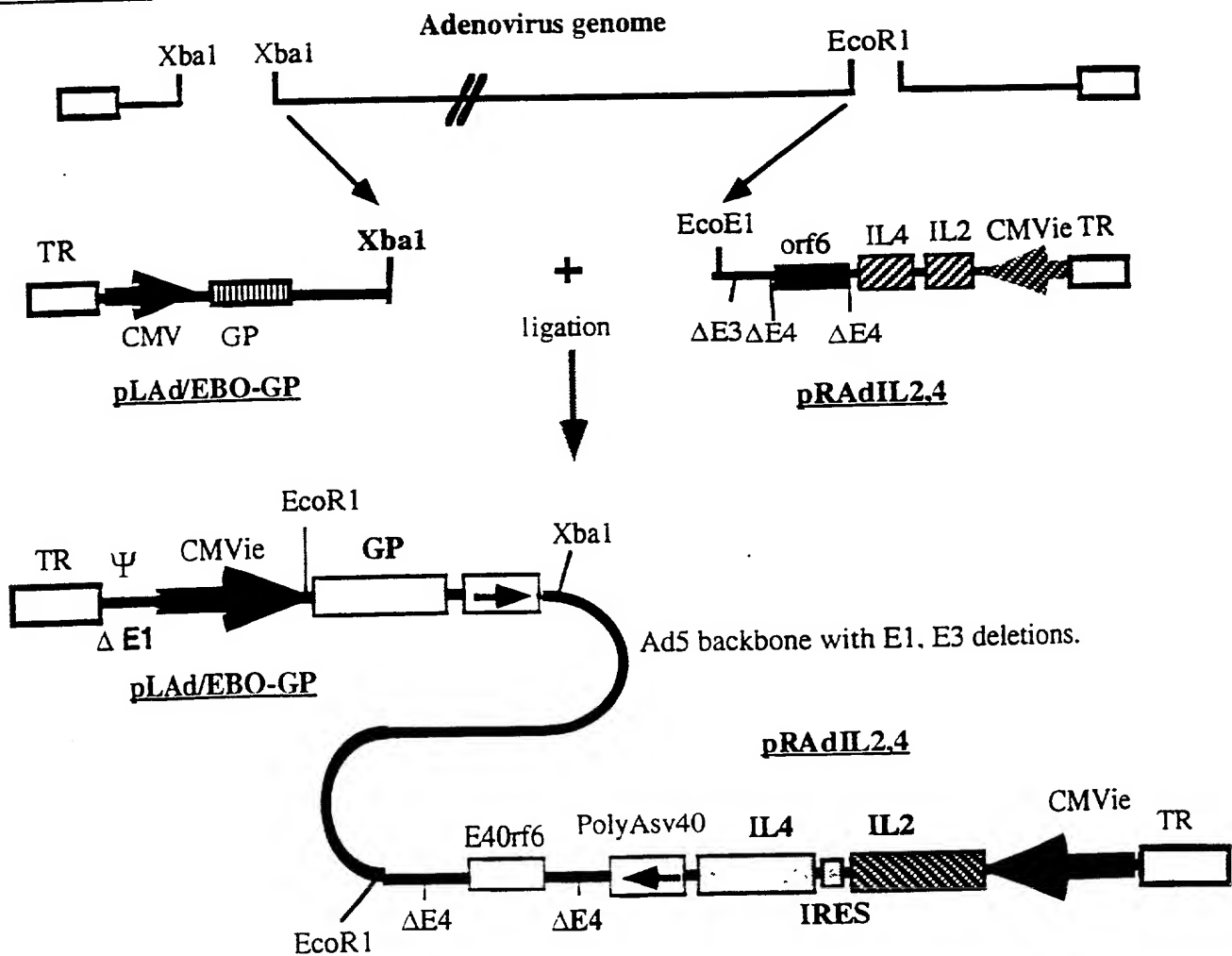
**FIGURE 3C**

IS-split and duplicated

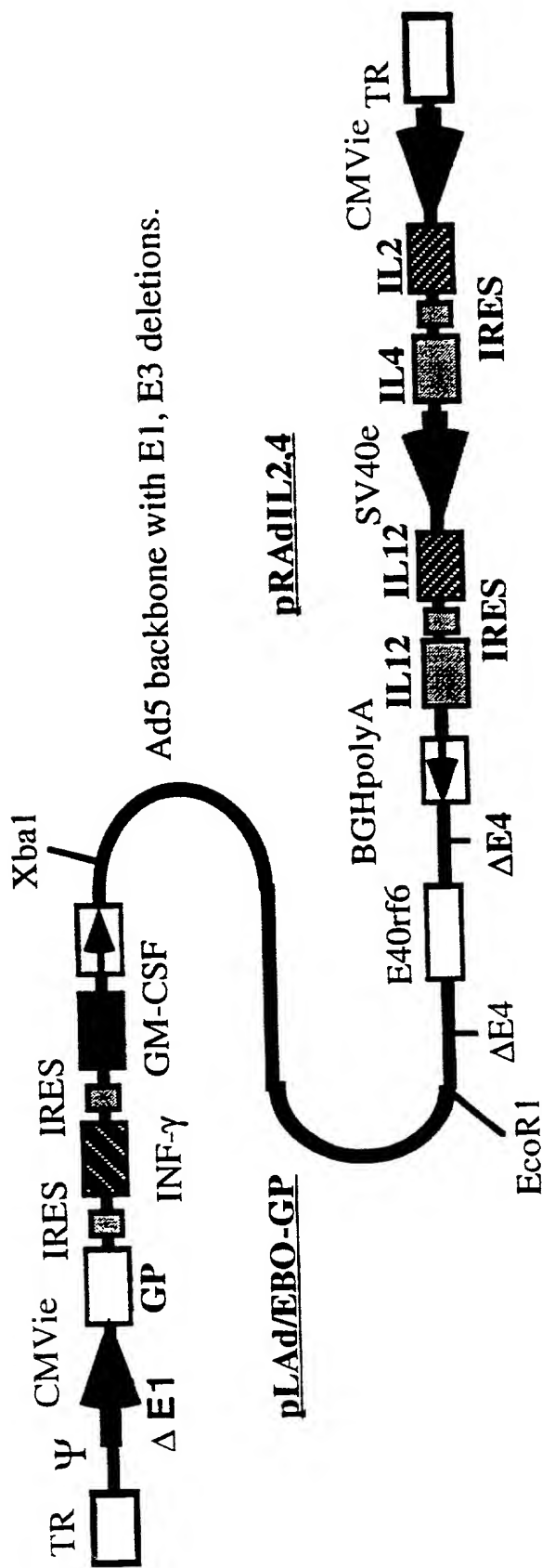
**FIGURE 4A**



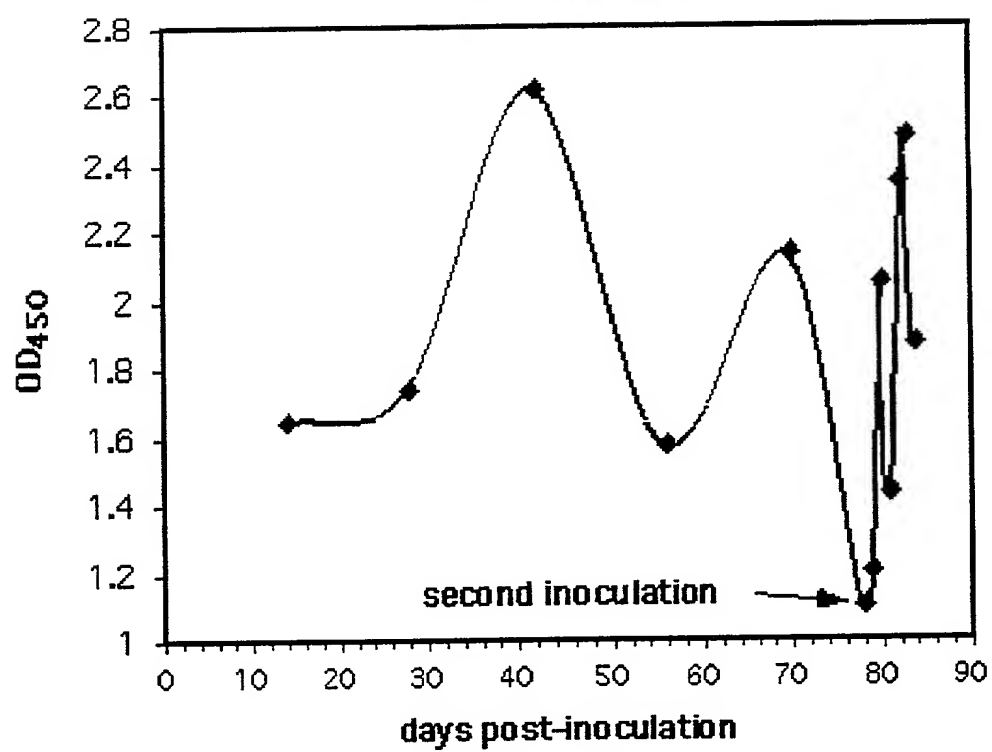
**FIGURE 4B**



**FIGURE 5**

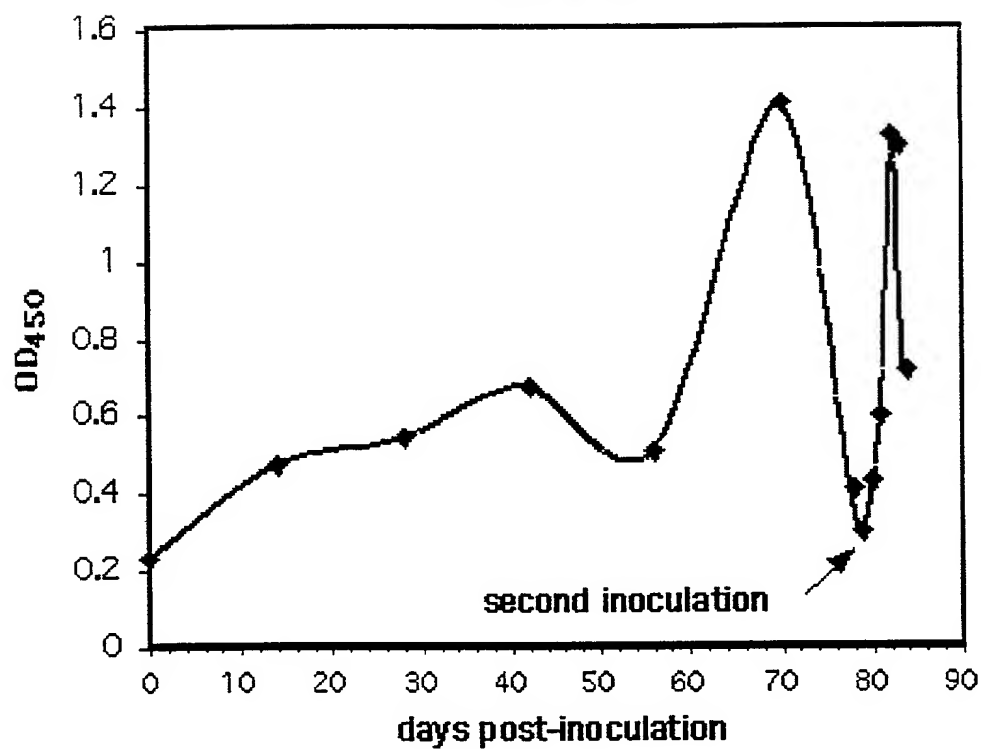


Anti-HIV (tat,env) relative titer  
(Group 3)



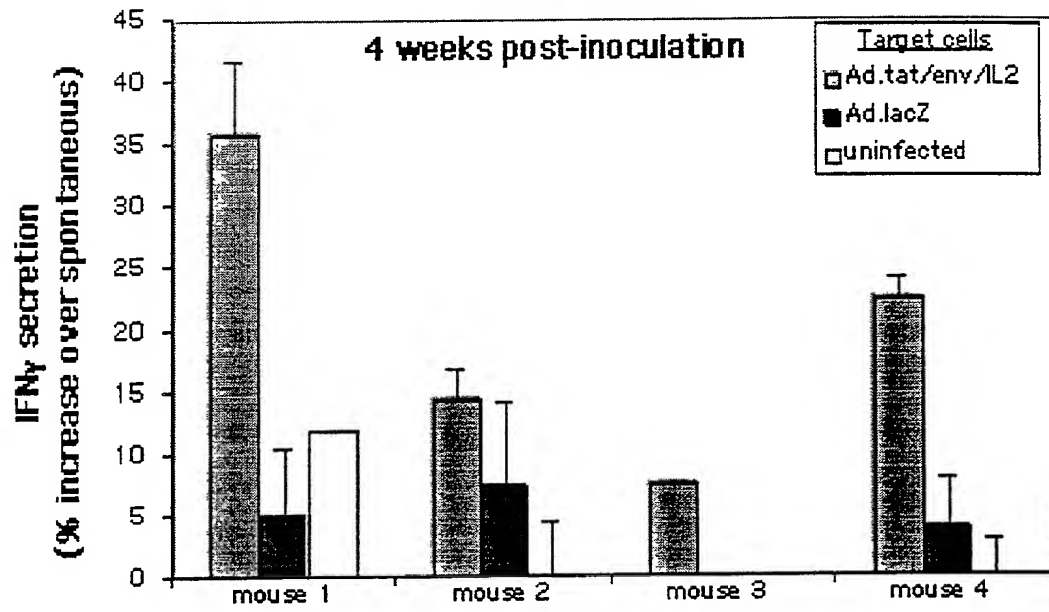
**FIGURE 6**

Anti-HIV (tat,env) relative titer  
(Group 4)



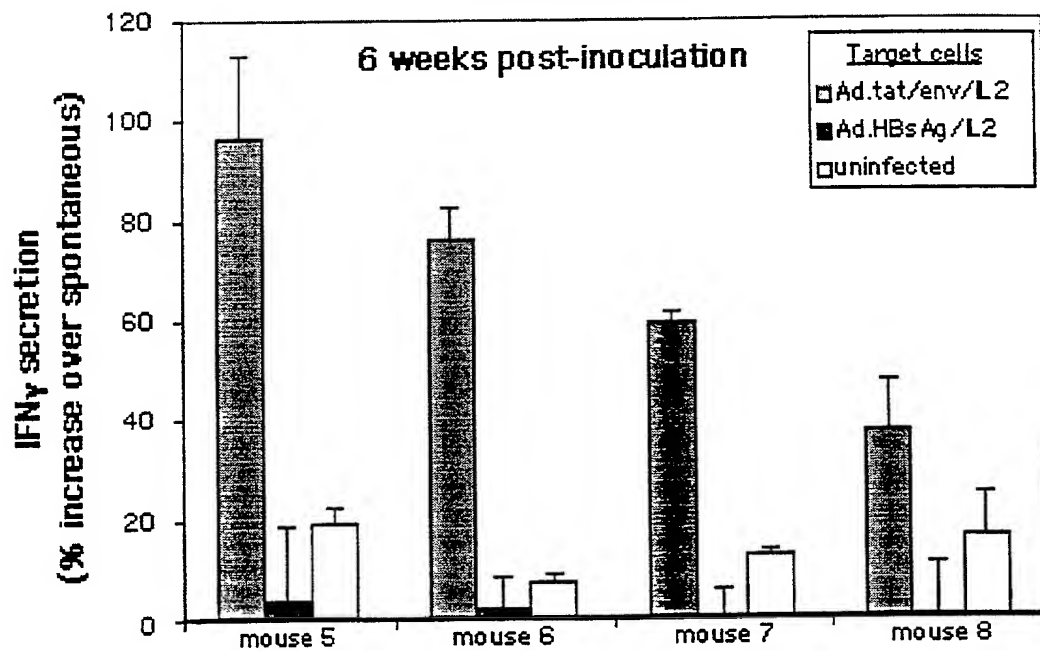
**FIGURE 7**

IFN $\gamma$  secretion from activated splenocytes in response to target  
cell stimulation



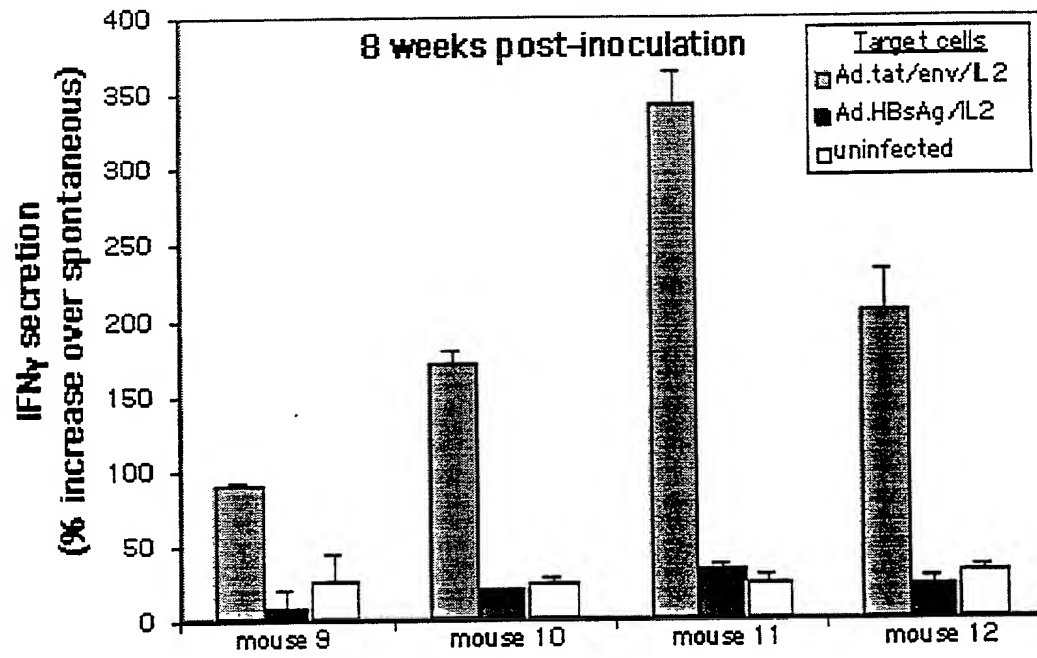
**FIGURE 8A**

IFN $\gamma$  secretion from activated splenocytes in response to target cell stimulation



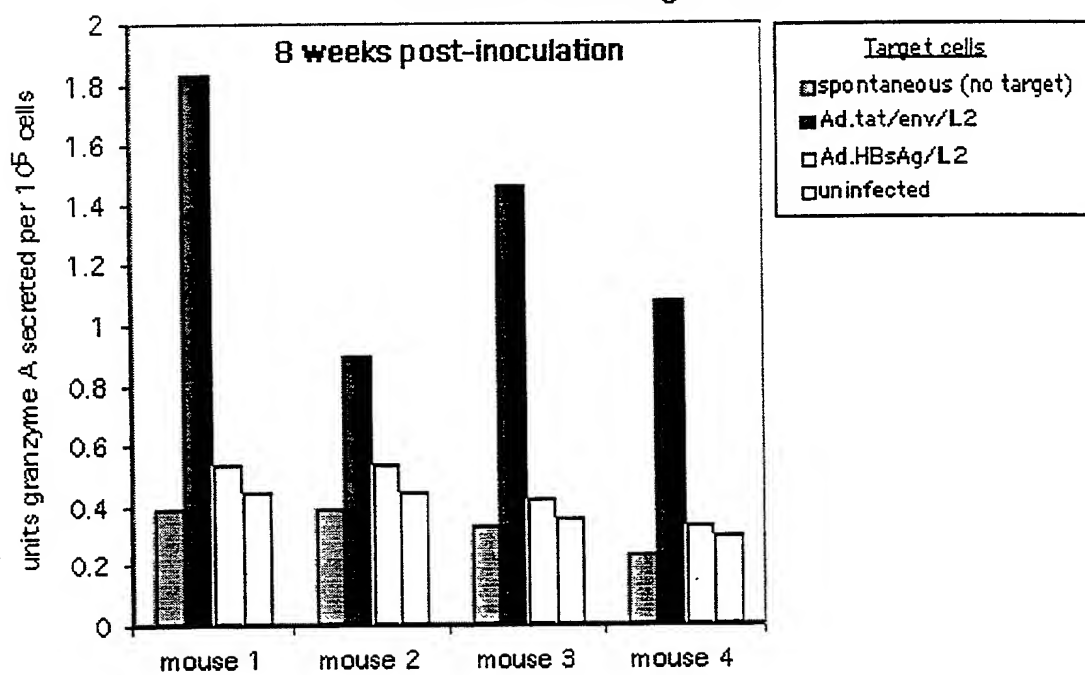
**FIGURE 8B**

IFN $\gamma$  secretion from activated splenocytes in response to target cell stimulation



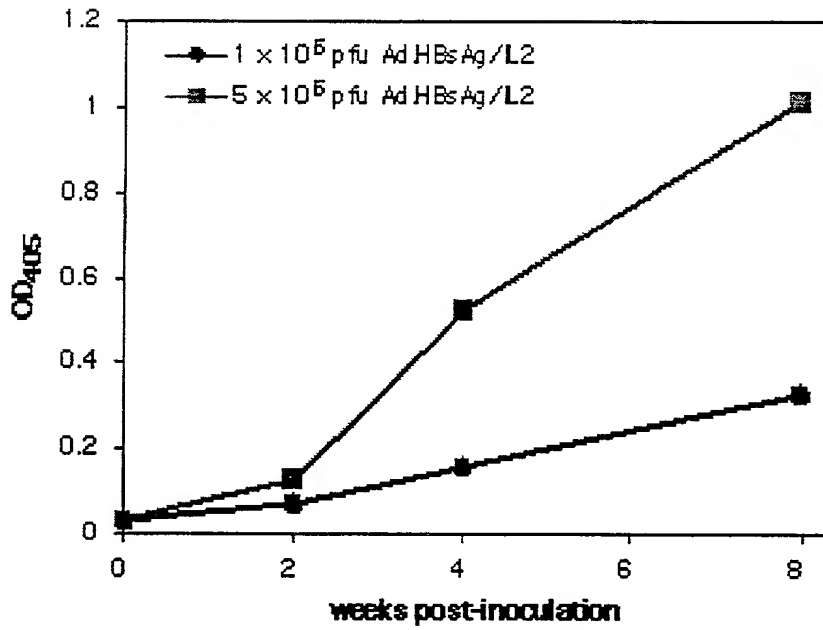
**FIGURE 8C**

Granzyme A secretion from activated splenocytes in response to stimulation with target cells



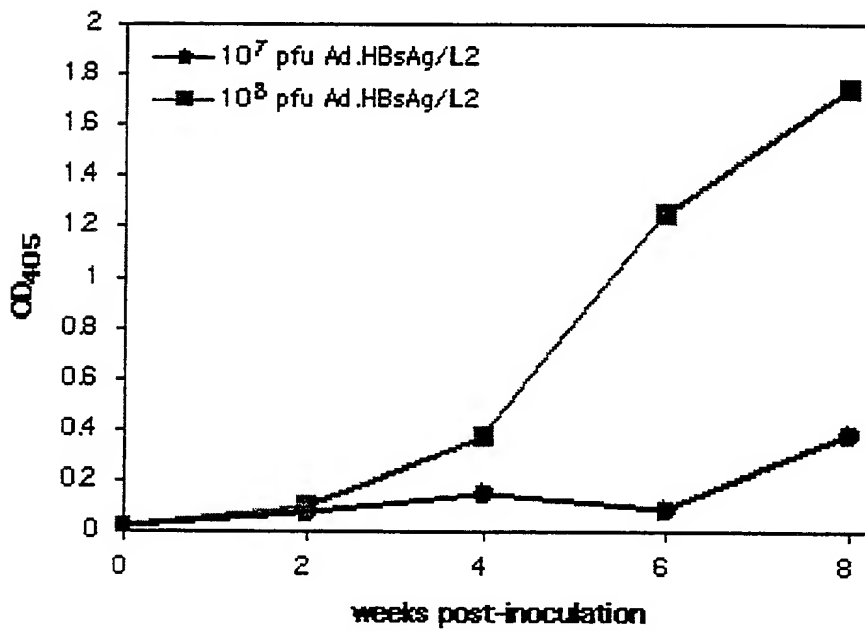
**FIGURE 9**

Anti-HBsAg relative titer  
(Group 1)



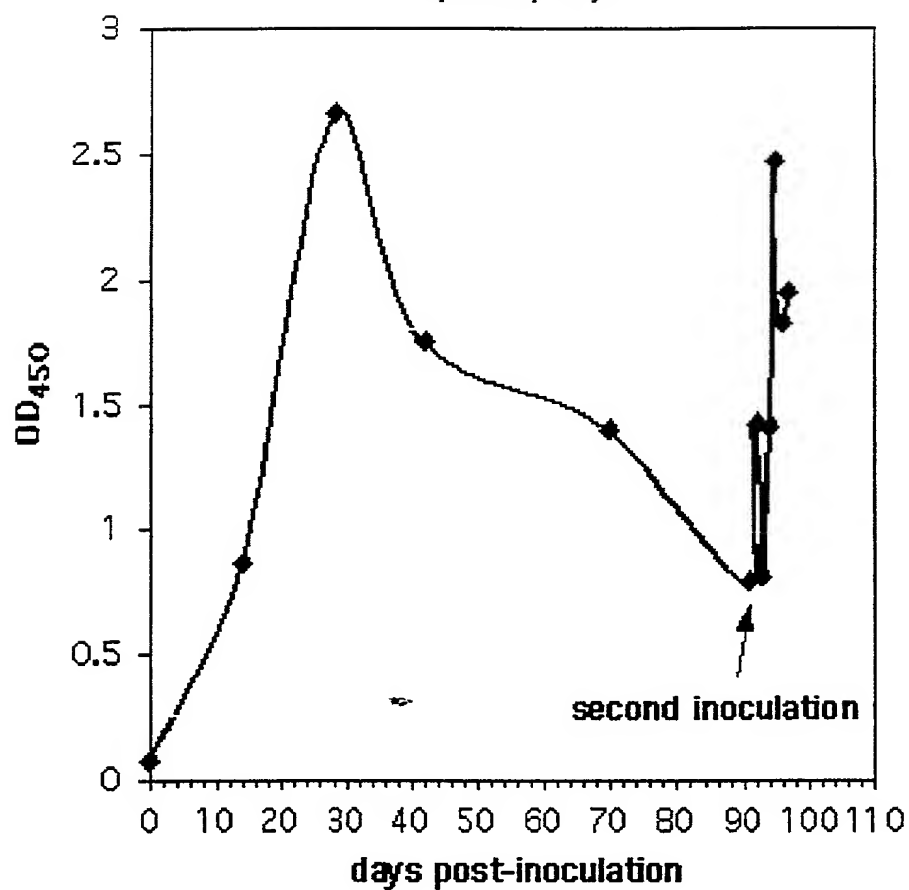
**FIGURE 10A**

Anti-HBsAg relative titer  
(Group 2)



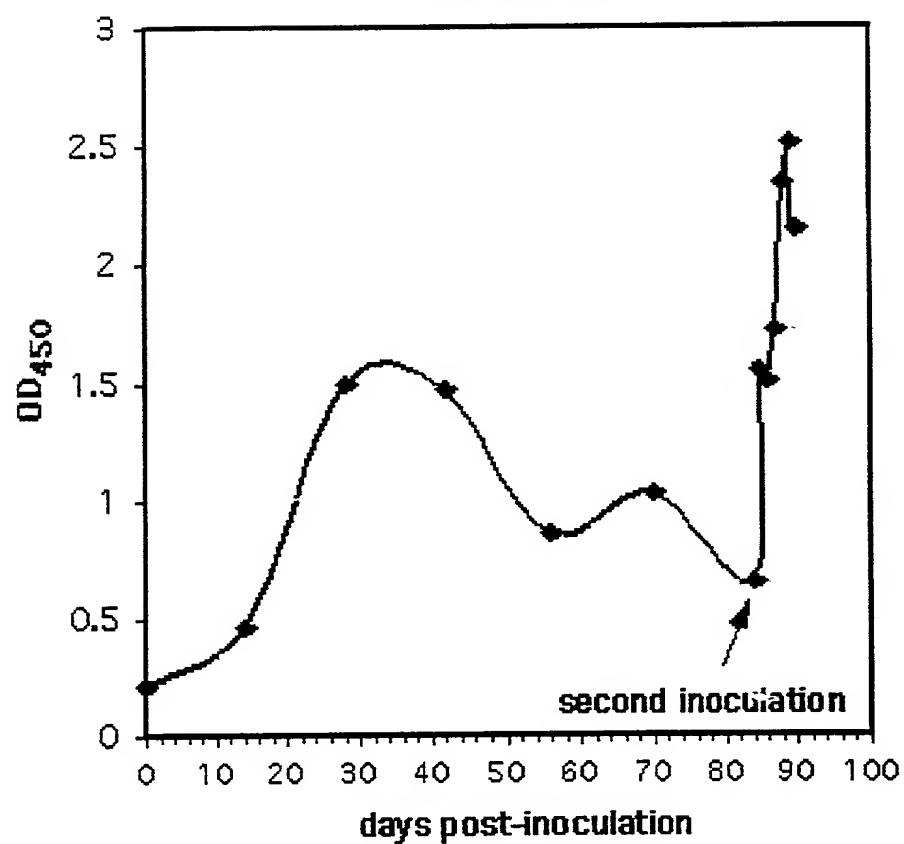
**FIGURE 10B**

Anti-HBcAg relative titer  
(Group 3)



**FIGURE 11A**

Anti-HBcAg relative titer  
(Group 4)



**FIGURE 11B**

FIGURE 12

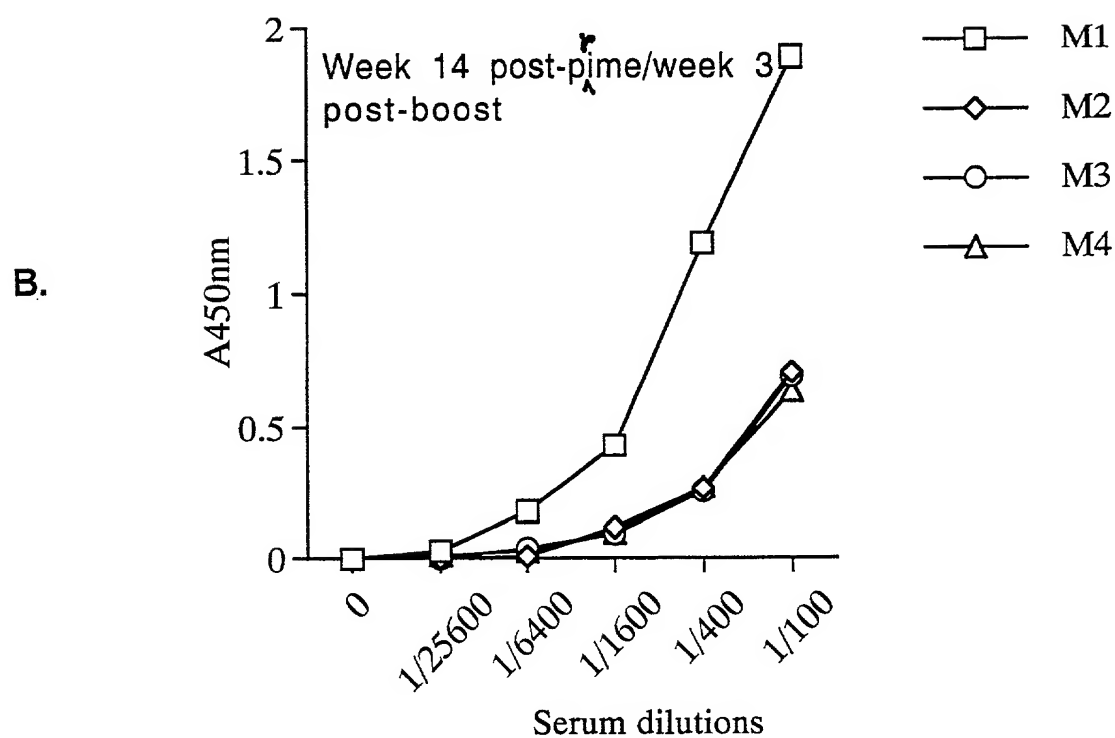
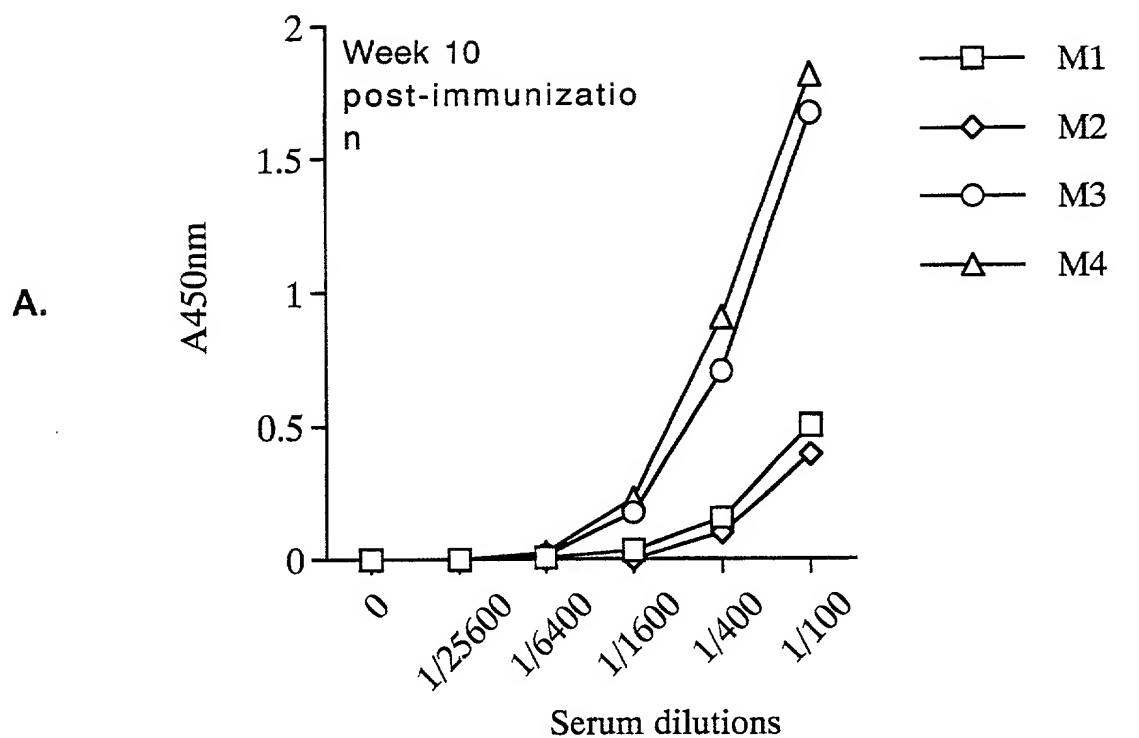
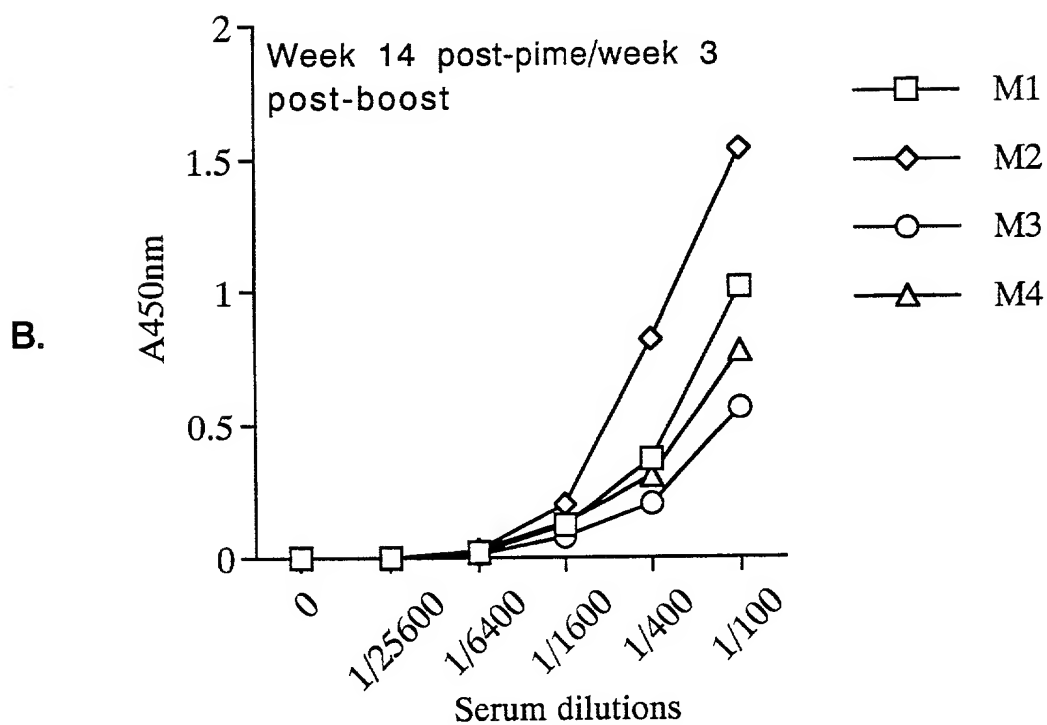
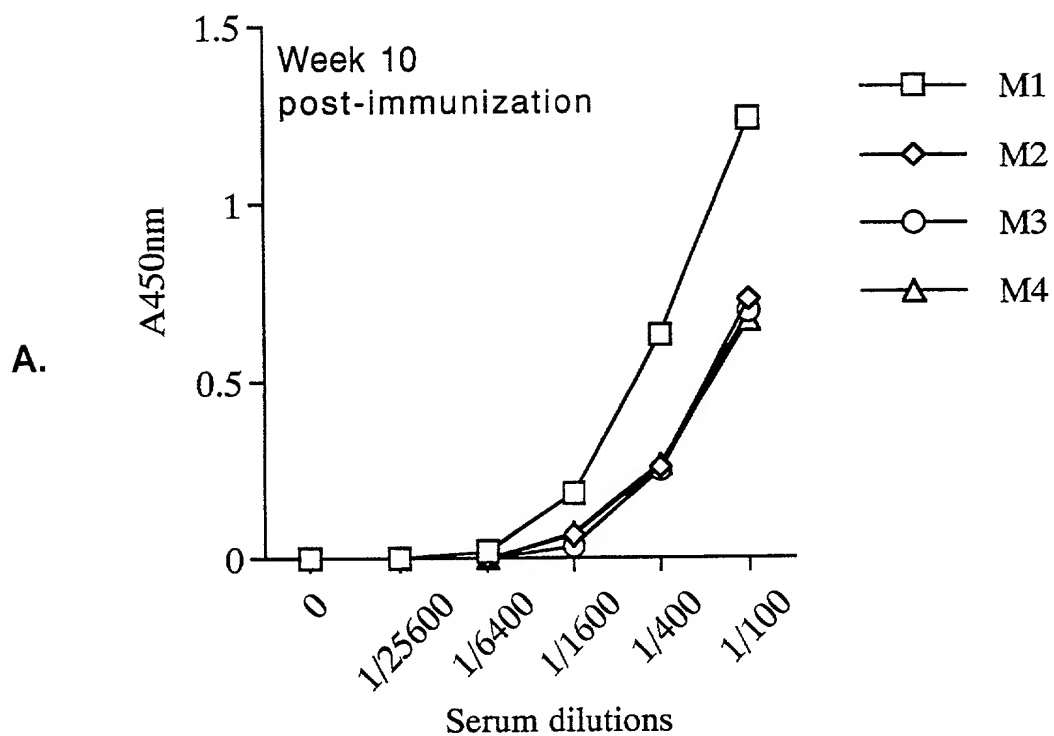


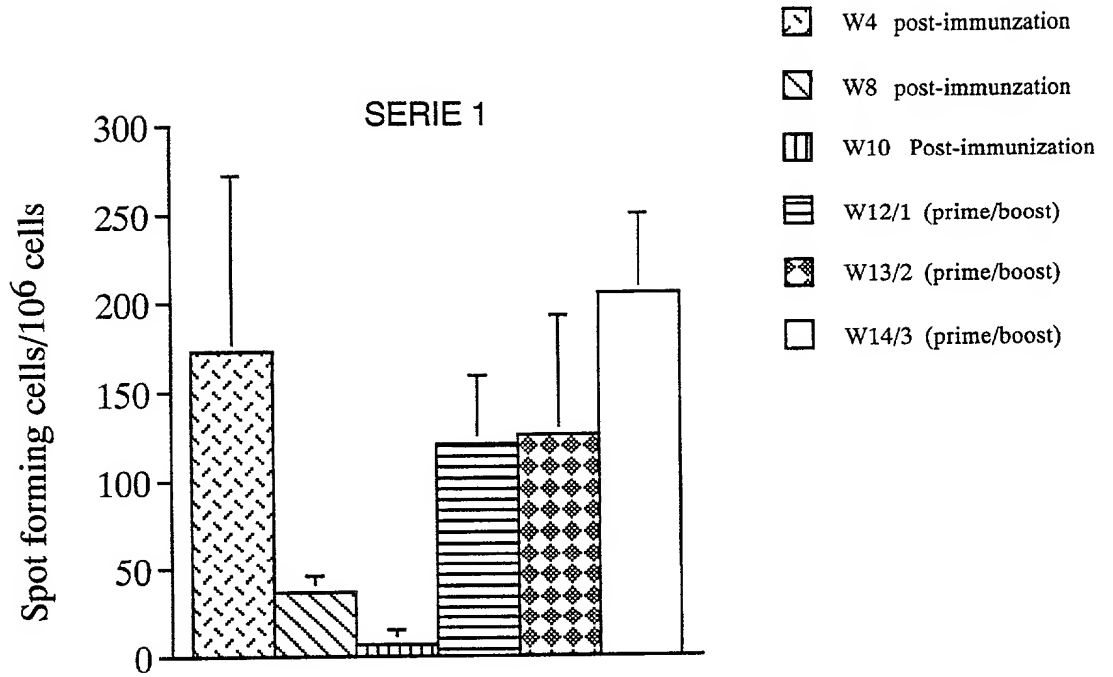
FIGURE 13



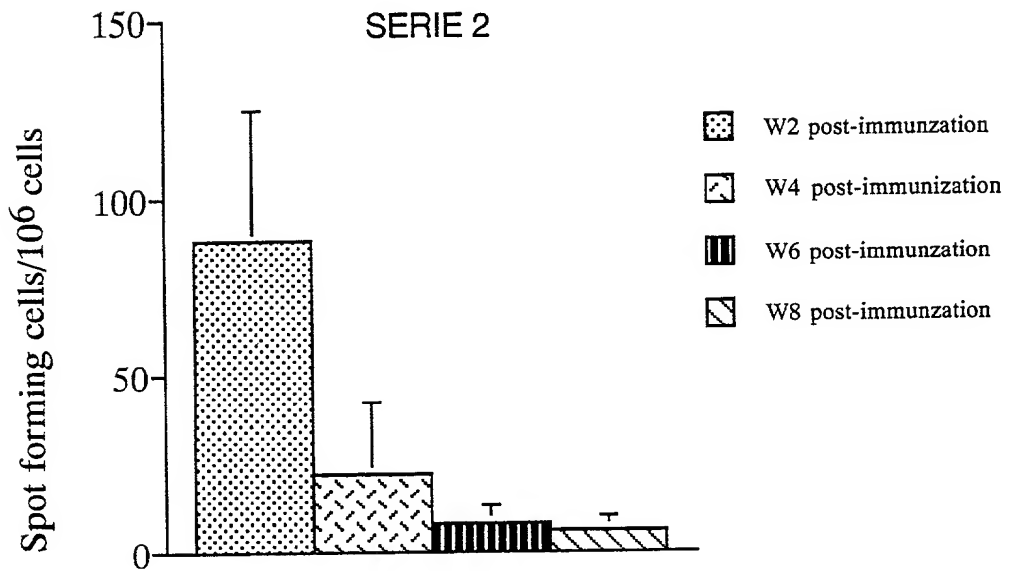
**FIGURE 14**

Gag-specific IFN $\gamma$  secreting splenic cells  
after immunization of mice with Ad(3C,  
Gag, Env)

**A.**

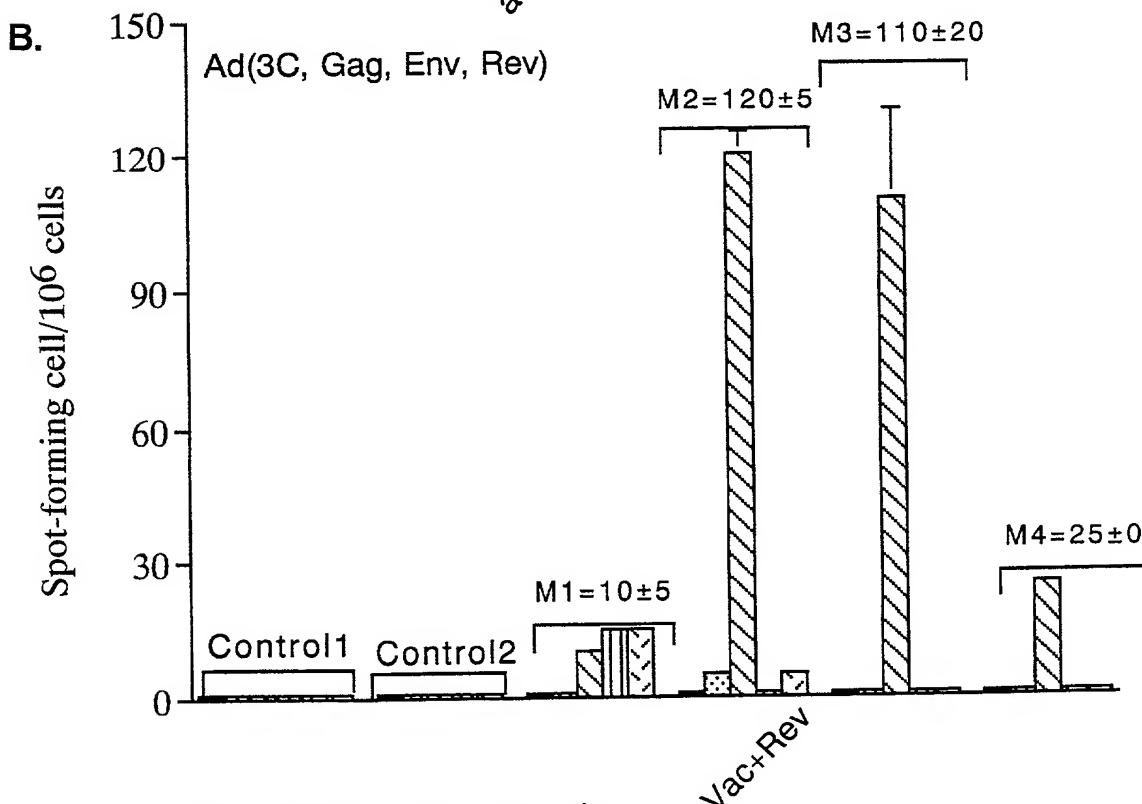
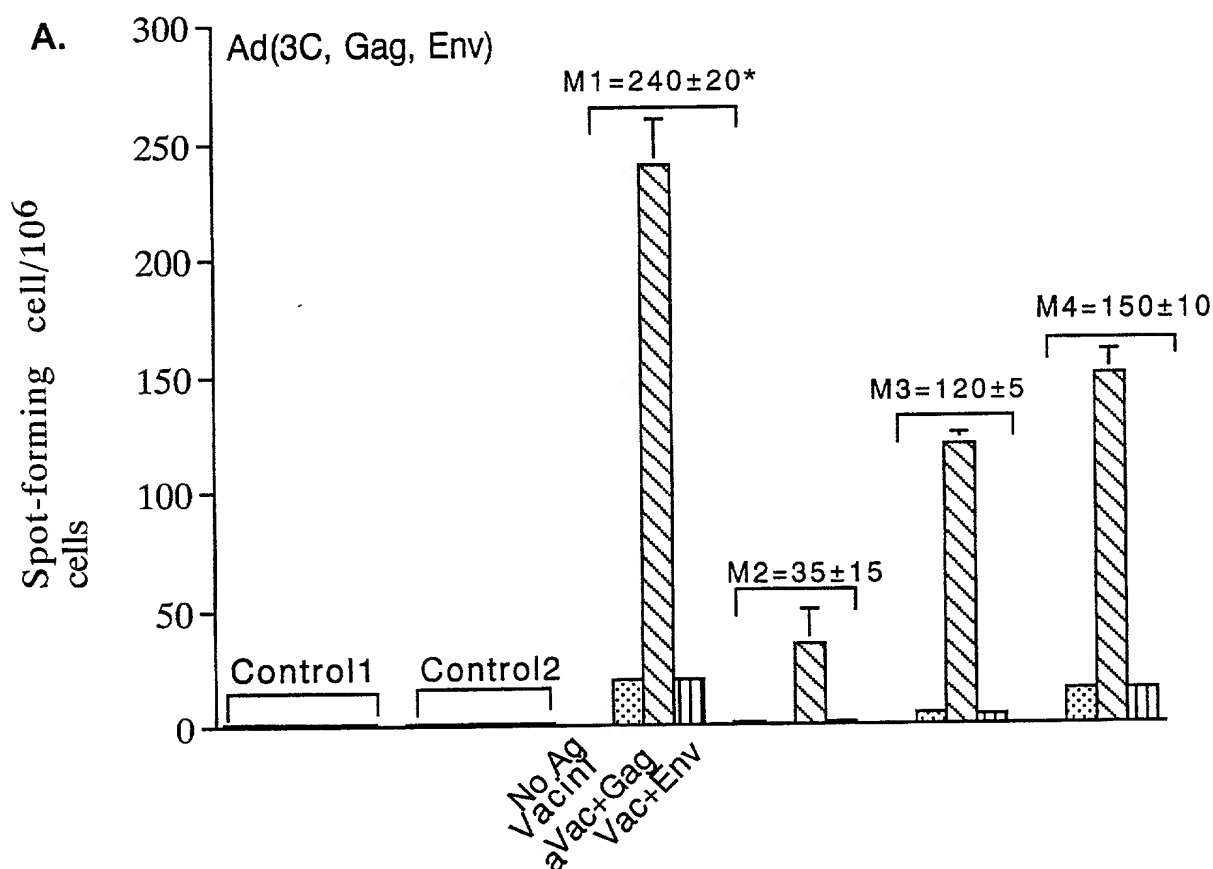


**B.**



**FIGURE 15**

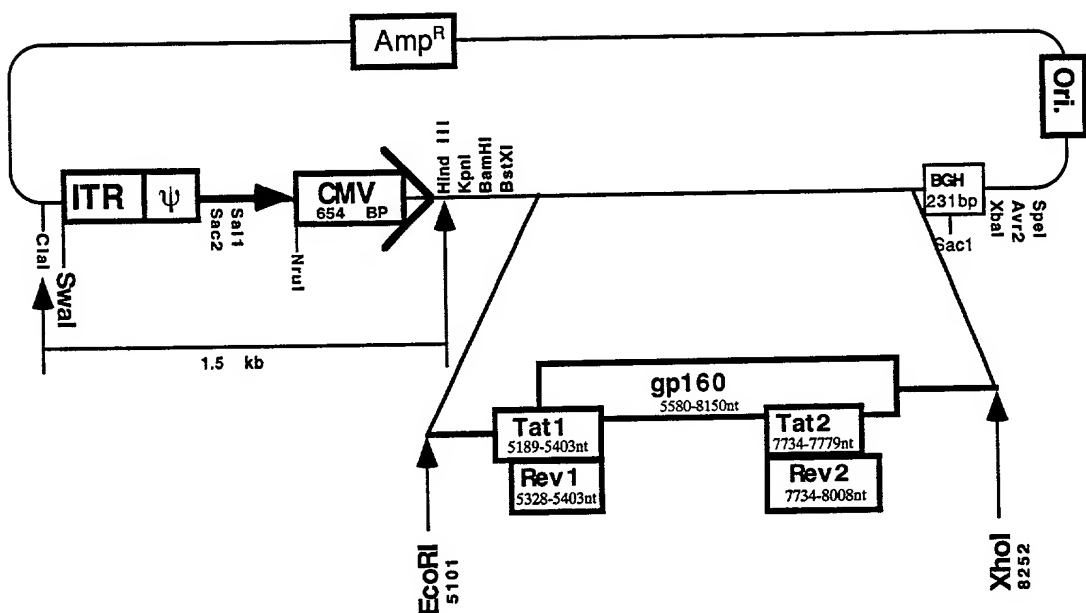
L23: ELISPOT for IFN $\gamma$  secretion: Serie1 spleen cells  
from mice at week W13/2 (post-prime/boost)



\* Gag-specific IFN $\gamma$  secreting

FIGURE 16 Ad-E.T.R/IL2 (from BH10 strain)

A. pLAd-E.T.R



B. pRAd.ORF6-IL2

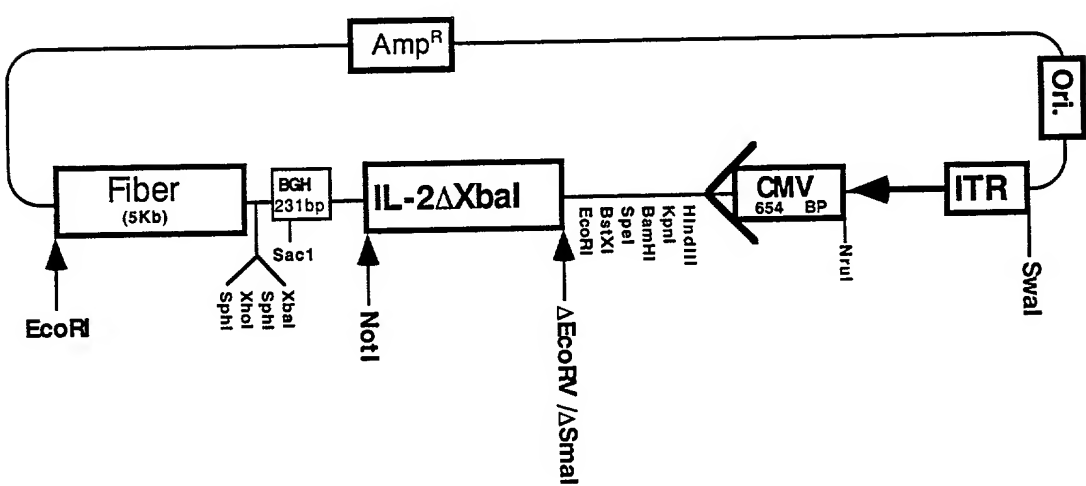
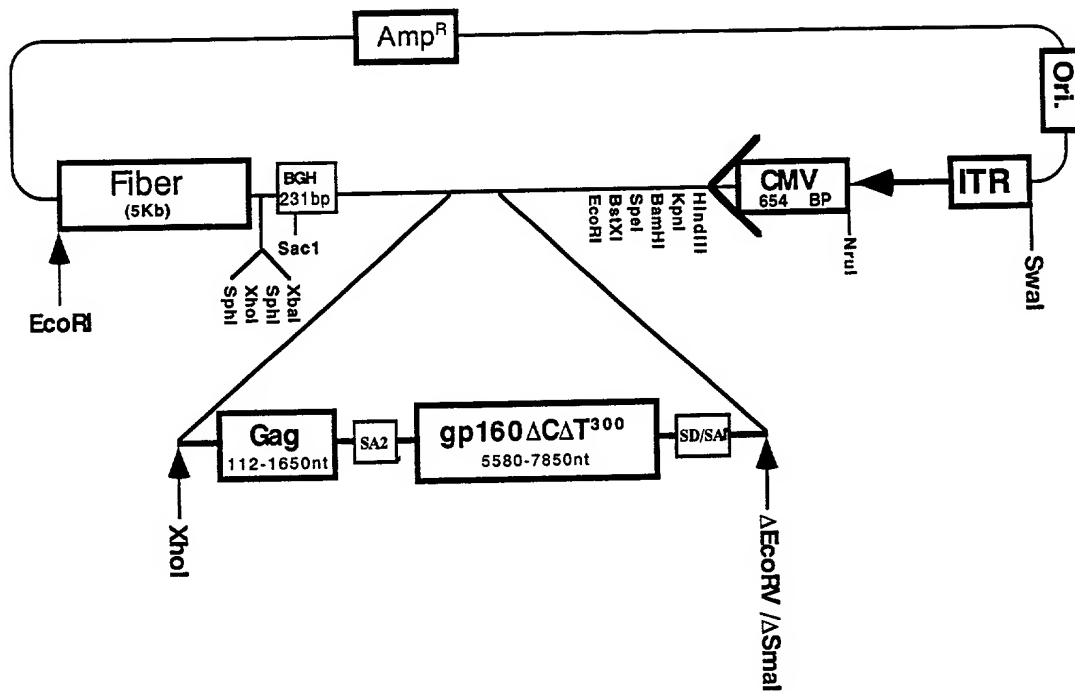


FIGURE 17 Ad-3C/E<sup>m</sup>ΔCAT<sup>300</sup>-G (from BH10 strain)

A. pRAd. ORF6-E<sup>m</sup>ΔCAT<sup>300</sup>-G



B. pLAd-3C

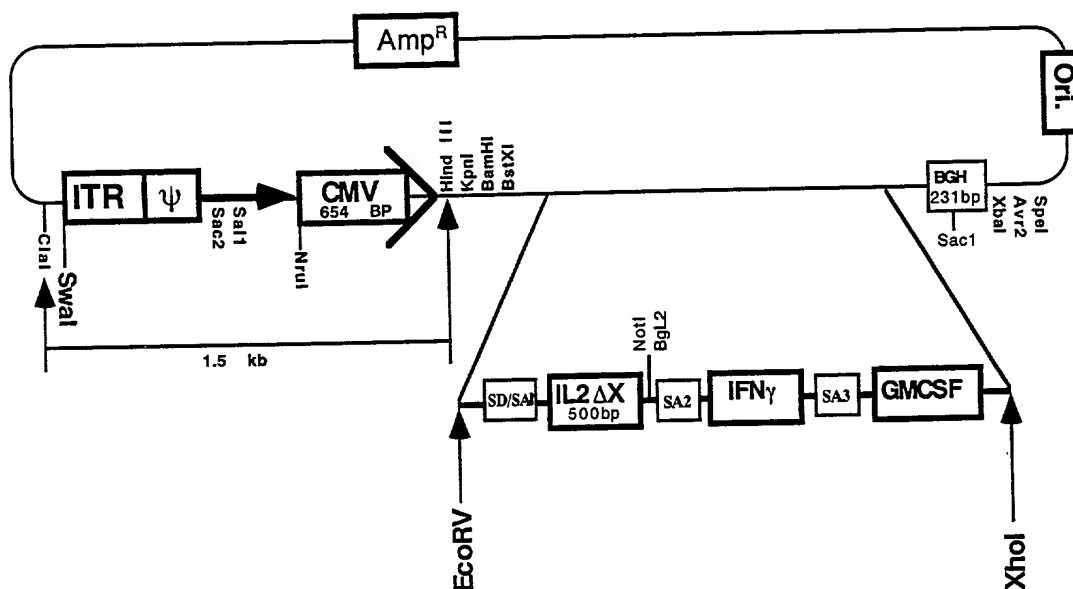


FIGURE 18

pRAD. ORF6-E<sup>m</sup>ΔCAT<sup>99</sup>.T.R-G

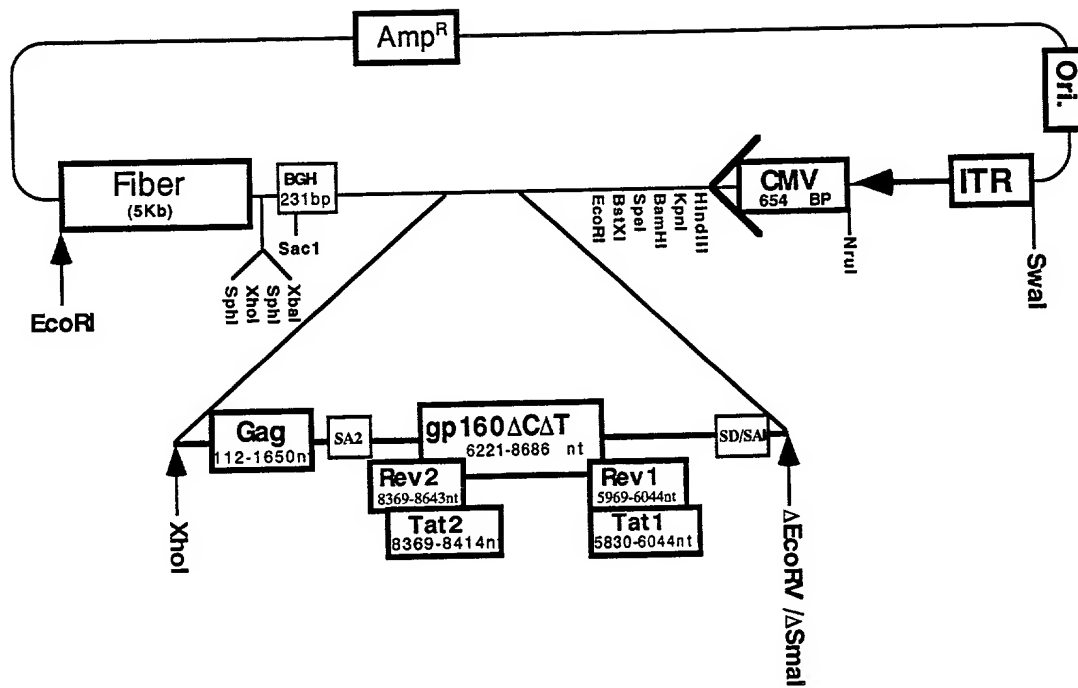
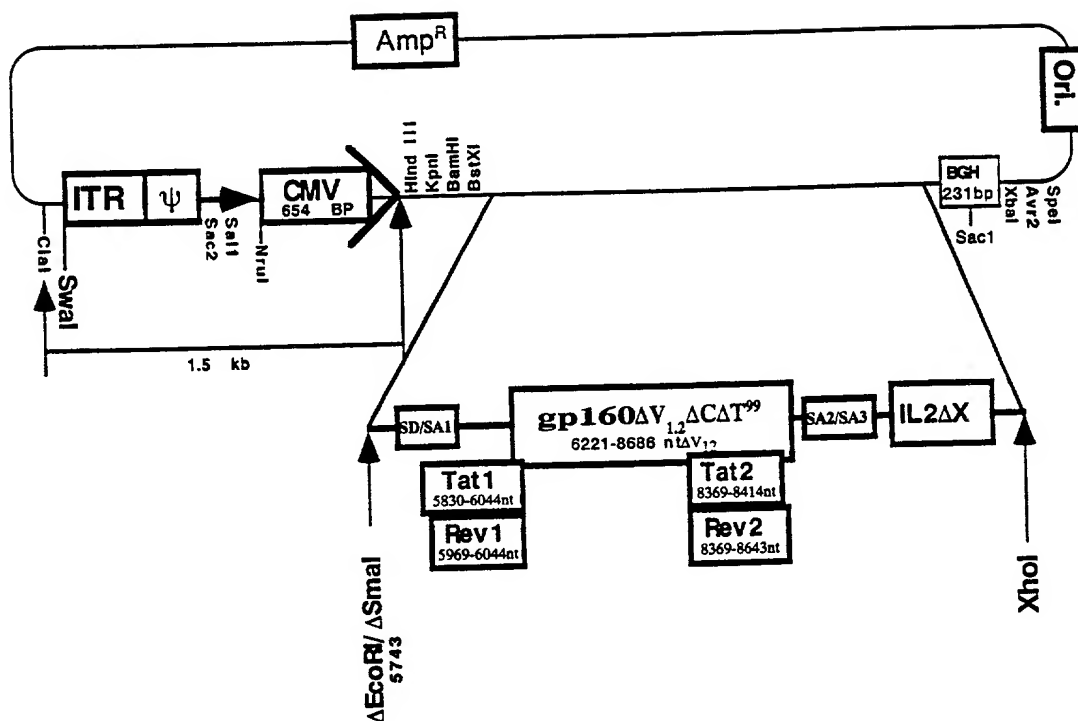


FIGURE 19

A. pLAd-E<sup>m</sup>ΔV<sub>1,2</sub>ΔCAT.T.R-IL2



B. pRAAd.ORF6-G.IL2

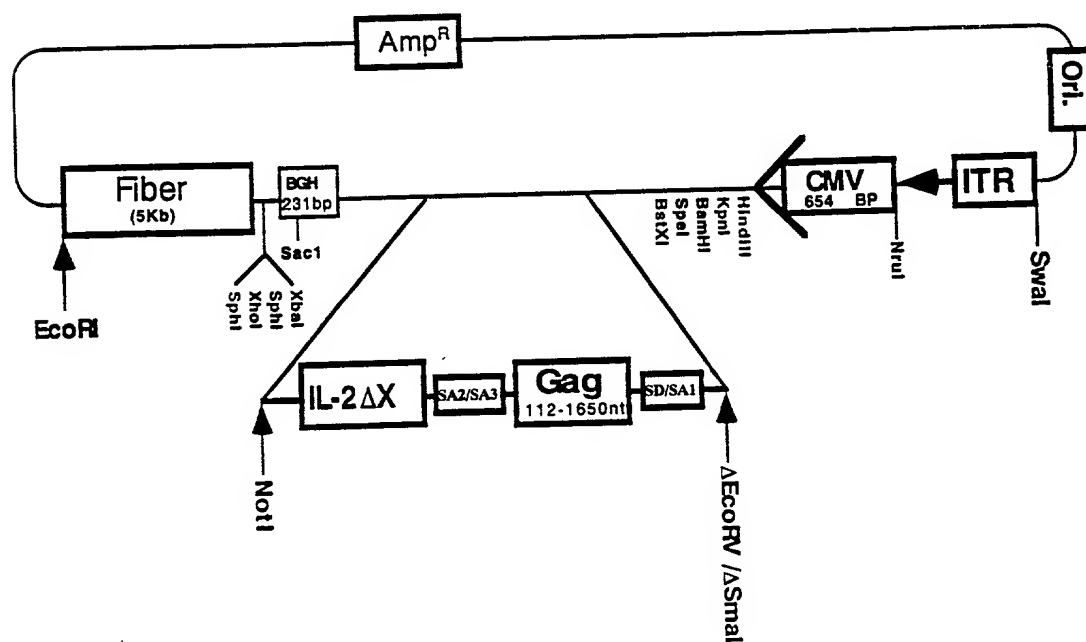


FIGURE 20

pLAd-ETRN

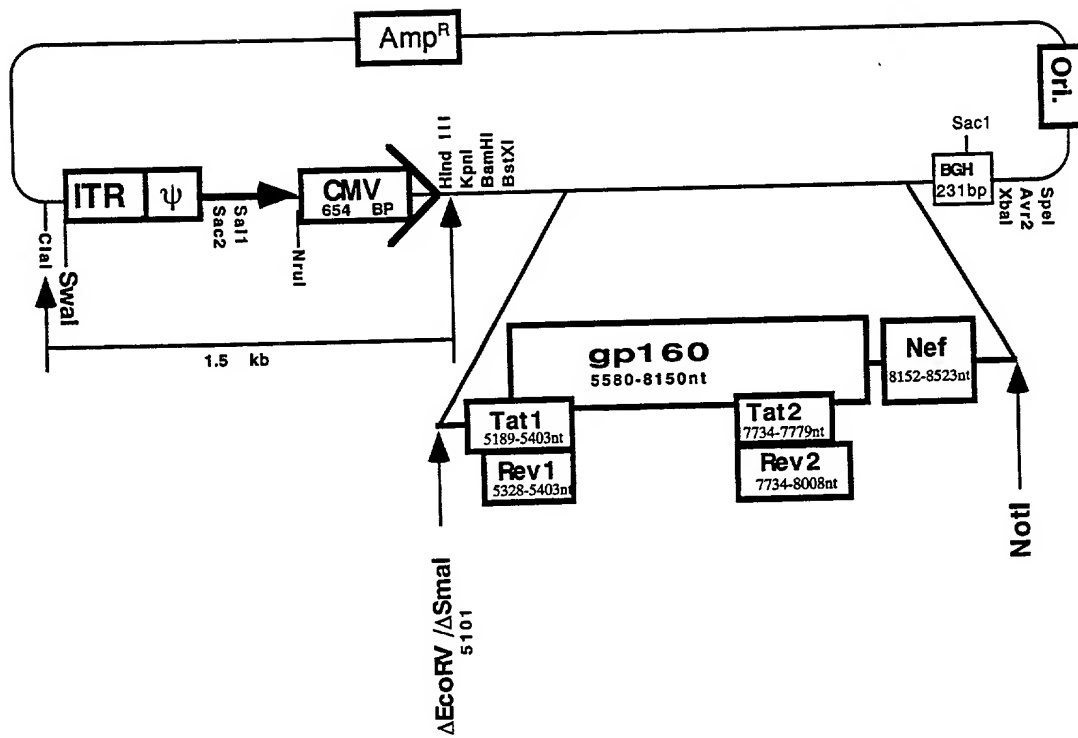


FIGURE 21

pLAd-E<sup>m</sup> $\Delta$ C.N

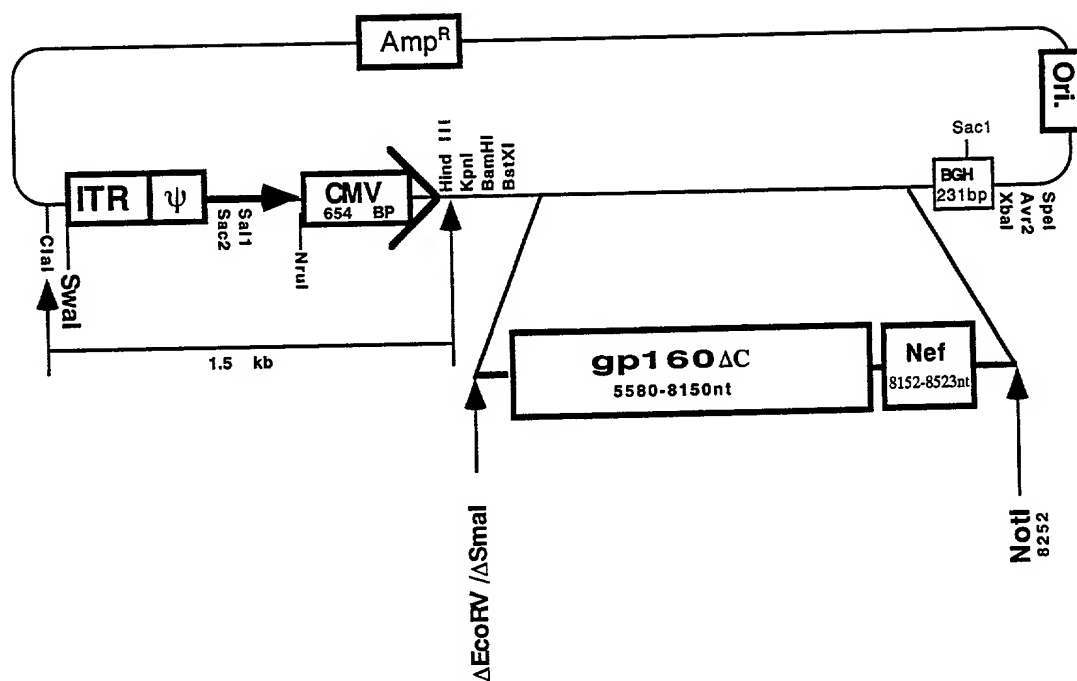
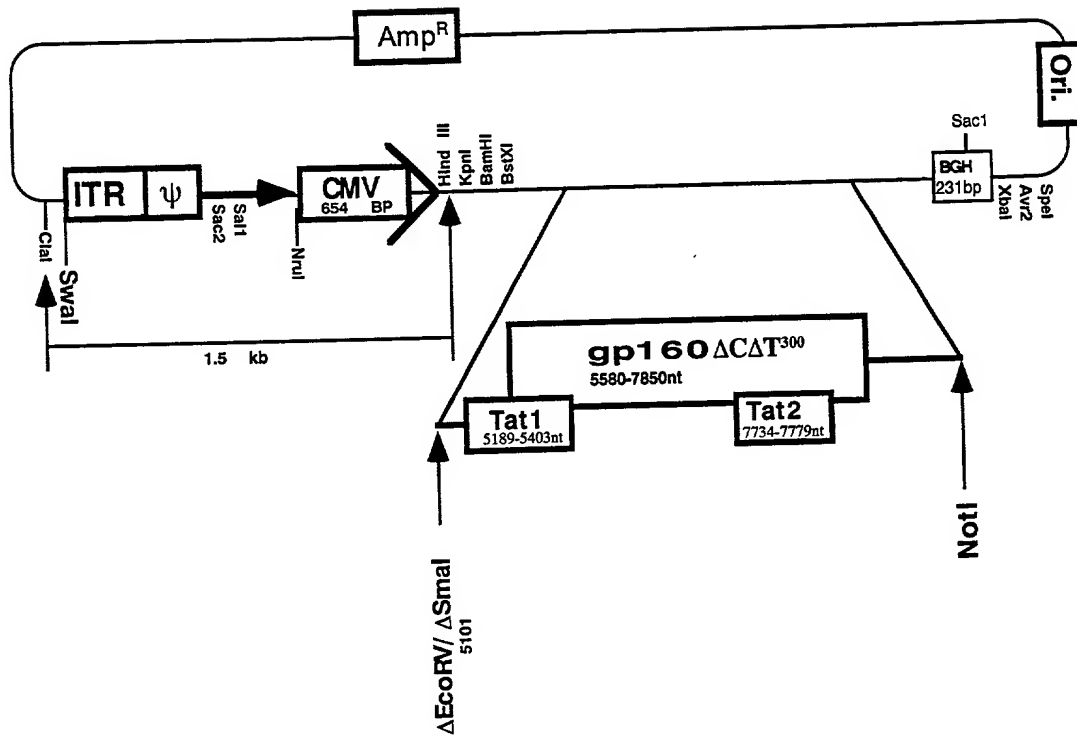


FIGURE 22

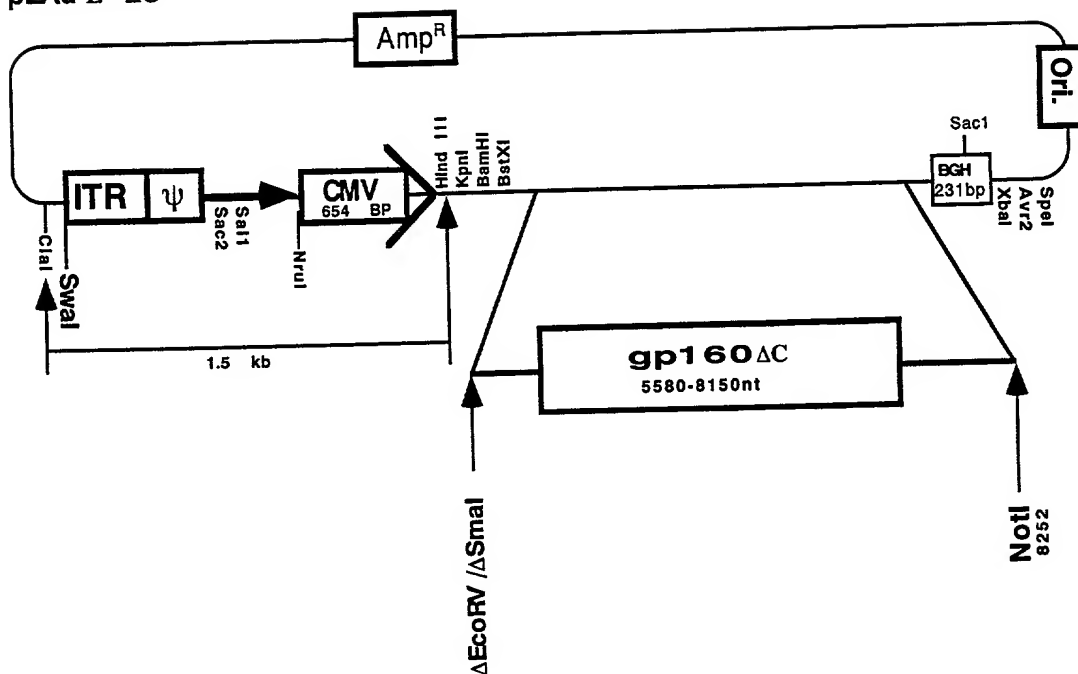
pLAd-E<sup>m</sup>ΔCAT<sup>300</sup>.T



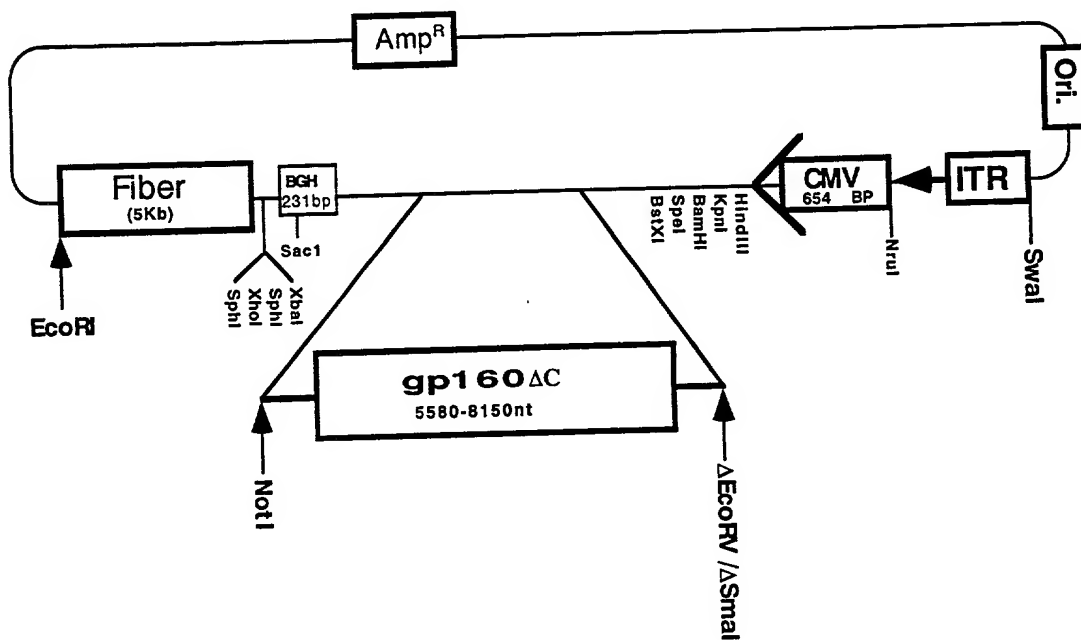
10003035 110401

FIGURE 23

A. pLAd-E<sup>m</sup> $\Delta$ C

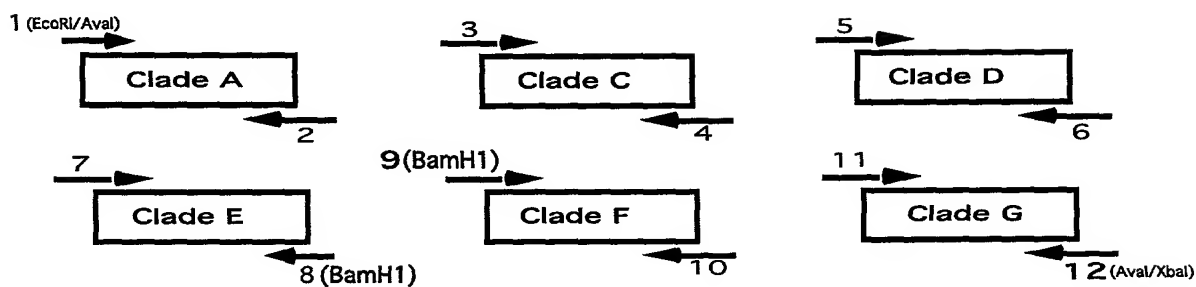


B. pRAAd.ORF6-E<sup>m</sup> $\Delta$ C

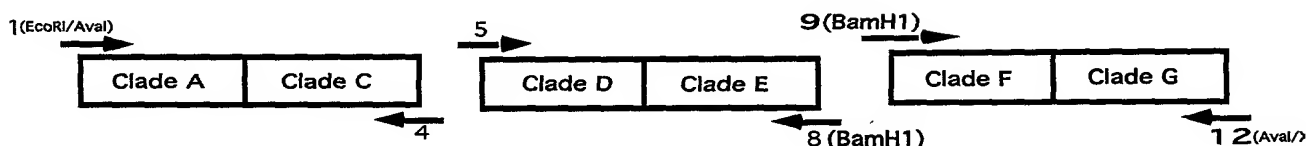


# FIGURE 24

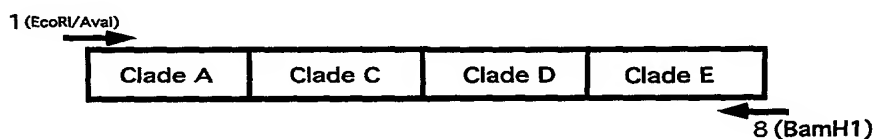
## Step 1. Amplification of each individual clone A-G



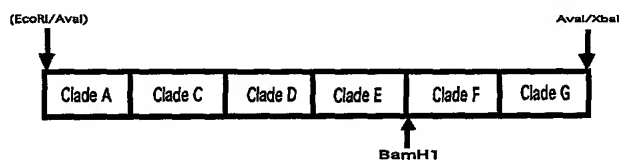
## Step 2. Amplification of every two Clones AC, DE, FG



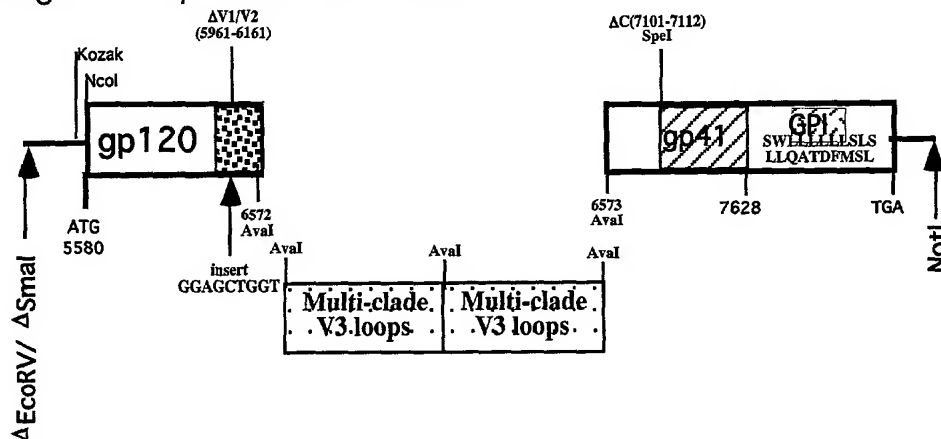
## Step 3. Amplification of Clones ACDE



## Step 4. Cloning the multi-clones into pSP73 vector



## Step 5. Generating of a duplicated multi-clones



Variable	Mean	SD	Min	Max
Age	34.5	10.5	20	55
Gender	1.0	0.0	0	1
Marital status	1.0	0.0	0	1
Education	12.5	1.5	9	16
Income	1.5	0.5	1	2
Occupation	1.0	0.0	0	1
Health status	1.0	0.0	0	1
Life satisfaction	1.0	0.0	0	1
Life expectancy	1.0	0.0	0	1
Life expectancy squared	1.0	0.0	0	1
Life expectancy cubed	1.0	0.0	0	1
Life expectancy quart	1.0	0.0	0	1
Life expectancy quint	1.0	0.0	0	1
Life expectancy sext	1.0	0.0	0	1
Life expectancy sept	1.0	0.0	0	1
Life expectancy oct	1.0	0.0	0	1
Life expectancy non	1.0	0.0	0	1
Life expectancy dec	1.0	0.0	0	1
Life expectancy undec	1.0	0.0	0	1
Life expectancy duodec	1.0	0.0	0	1
Life expectancy tredec	1.0	0.0	0	1
Life expectancy quaterdec	1.0	0.0	0	1
Life expectancy quindec	1.0	0.0	0	1
Life expectancy sexdec	1.0	0.0	0	1
Life expectancy septdec	1.0	0.0	0	1
Life expectancy octodec	1.0	0.0	0	1
Life expectancy nondec	1.0	0.0	0	1
Life expectancy undecdec	1.0	0.0	0	1
Life expectancy duodecdec	1.0	0.0	0	1
Life expectancy tredecdec	1.0	0.0	0	1
Life expectancy quaterdecdec	1.0	0.0	0	1
Life expectancy quindecdec	1.0	0.0	0	1
Life expectancy sexdecdec	1.0	0.0	0	1
Life expectancy septdecdec	1.0	0.0	0	1
Life expectancy octodecdec	1.0	0.0	0	1
Life expectancy nondecdec	1.0	0.0	0	1
Life expectancy undecdecdec	1.0	0.0	0	1
Life expectancy duodecdecdec	1.0	0.0	0	1
Life expectancy tredecdecdec	1.0	0.0	0	1
Life expectancy quaterdecdecdec	1.0	0.0	0	1
Life expectancy quindecdecdec	1.0	0.0	0	1
Life expectancy sexdecdecdec	1.0	0.0	0	1
Life expectancy septdecdecdec	1.0	0.0	0	1
Life expectancy octodecdecdec	1.0	0.0	0	1
Life expectancy nondecdecdec	1.0	0.0	0	1
Life expectancy undecdecdecdec	1.0	0.0	0	1
Life expectancy duodecdecdecdec	1.0	0.0	0	1
Life expectancy tredecdecdecdec	1.0	0.0	0	1
Life expectancy quaterdecdecdecdec	1.0	0.0	0	1
Life expectancy quindecdecdecdec	1.0	0.0	0	1
Life expectancy sexdecdecdecdec	1.0	0.0	0	1
Life expectancy septdecdecdecdec	1.0	0.0	0	1
Life expectancy octodecdecdecdec	1.0	0.0	0	1
Life expectancy nondecdecdecdec	1.0	0.0	0	1
Life expectancy undecdecdecdecdec	1.0	0.0	0	1
Life expectancy duodecdecdecdecdec	1.0	0.0	0	1
Life expectancy tredecdecdecdecdec	1.0	0.0	0	1
Life expectancy quaterdecdecdecdecdec	1.0	0.0	0	1
Life expectancy quindecdecdecdecdec	1.0	0.0	0	1
Life expectancy sexdecdecdecdecdec	1.0	0.0	0	1
Life expectancy septdecdecdecdecdec	1.0	0.0	0	1
Life expectancy octodecdecdecdecdec	1.0	0.0	0	1
Life expectancy nondecdecdecdecdec	1.0	0.0	0	1
Life expectancy undecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy duodecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy tredecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy quaterdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy quindecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy sexdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy septdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy octodecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy nondecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy undecdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy duodecdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy tredecdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy quaterdecdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy quindecdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy sexdecdecdecdecdecdecdec	1.0	0.0	0	1
Life expectancy septdecdecdecdecdecdecdec	1.0	0.0	0	1</

Variable	Mean	SD	Min	Max
Age	34.5	10.2	21	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	15.2	5.8	5	35
Occupation	1.2	0.8	0	2
Health status	1.5	0.5	1	2
Life satisfaction	4.2	1.2	1	7
Stress level	3.8	1.5	1	6
Work-life balance	2.5	1.0	1	4
Family support	3.5	1.2	1	5
Community involvement	2.8	1.1	1	4
Personal growth	3.2	1.3	1	5
Financial stability	2.9	1.0	1	4
Emotional well-being	3.6	1.1	1	5
Physical health	3.1	1.0	1	4
Social support	3.3	1.2	1	5
Work satisfaction	3.7	1.1	1	5
Life goals achievement	3.4	1.2	1	5
Overall quality of life	3.9	1.1	1	5

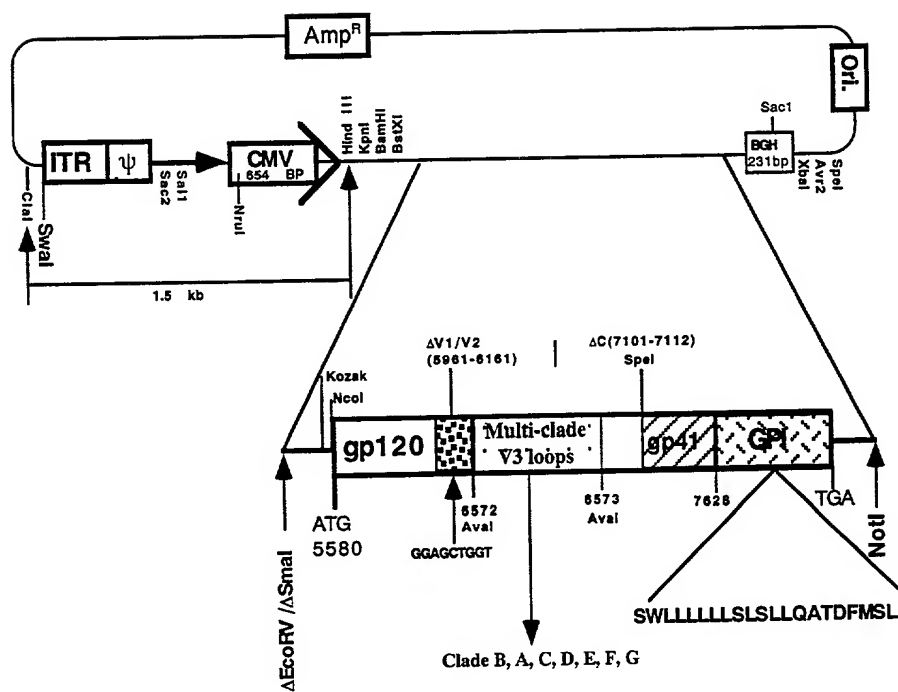
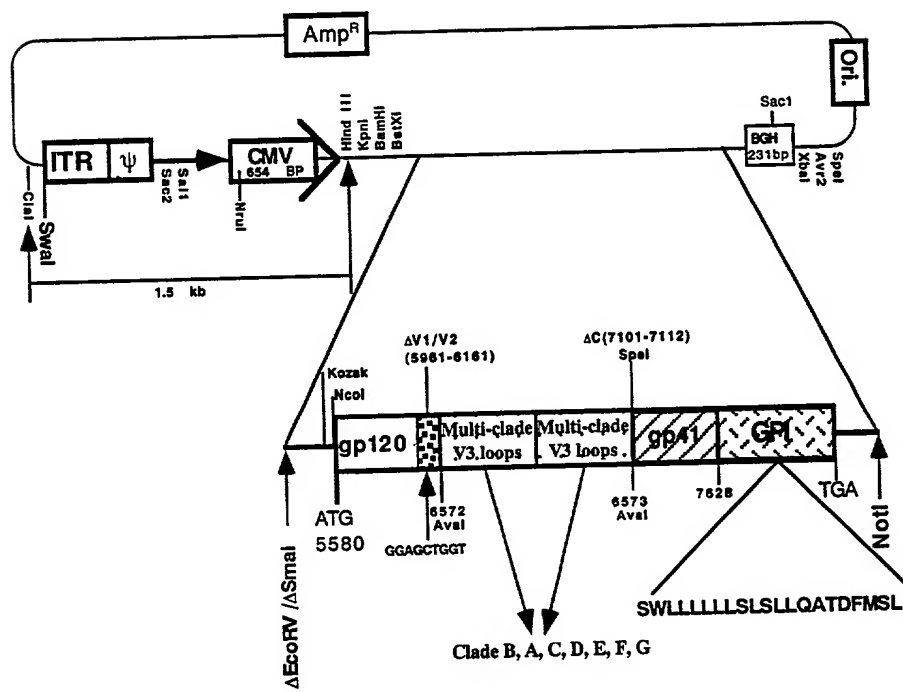
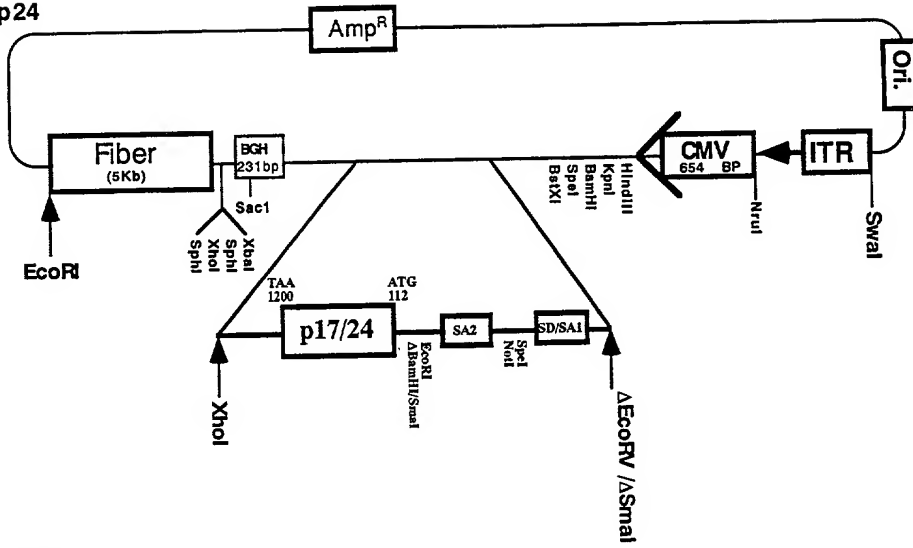


FIGURE 26

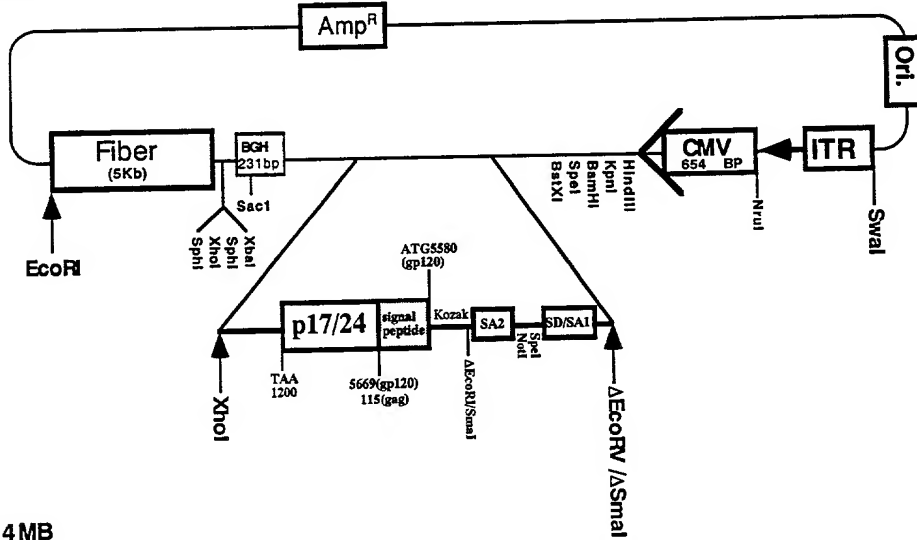


Variable	Mean	SD	Min	Max
Age	34.5	10.2	18	65
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	15.2	8.5	5	35
Occupation	1.2	0.8	0	2
Health status	1.5	0.5	1	2
Stress level	2.5	1.2	1	4
Life satisfaction	3.5	1.5	1	5
Resilience	4.5	1.5	1	6
Optimism	5.5	1.5	1	7
Self-efficacy	6.5	1.5	1	8
Emotional stability	7.5	1.5	1	9
Psychological well-being	8.5	1.5	1	10
Life meaning	9.5	1.5	1	11
Personal growth	10.5	1.5	1	12
Life satisfaction	11.5	1.5	1	13
Life satisfaction	12.5	1.5	1	14
Life satisfaction	13.5	1.5	1	15
Life satisfaction	14.5	1.5	1	16
Life satisfaction	15.5	1.5	1	17
Life satisfaction	16.5	1.5	1	18
Life satisfaction	17.5	1.5	1	19
Life satisfaction	18.5	1.5	1	20
Life satisfaction	19.5	1.5	1	21
Life satisfaction	20.5	1.5	1	22
Life satisfaction	21.5	1.5	1	23
Life satisfaction	22.5	1.5	1	24
Life satisfaction	23.5	1.5	1	25
Life satisfaction	24.5	1.5	1	26
Life satisfaction	25.5	1.5	1	27
Life satisfaction	26.5	1.5	1	28
Life satisfaction	27.5	1.5	1	29
Life satisfaction	28.5	1.5	1	30

**A. pRAAd. ORF6-p17/ p24**



**B. pRAd.ORF6-p17/24sec**



**C. pRAAd. ORF6-p17/24MB**

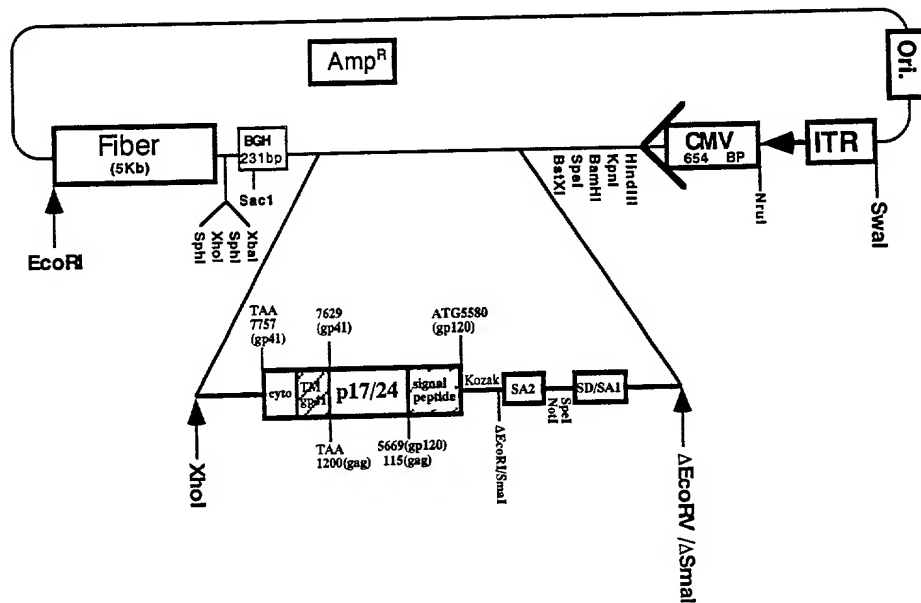
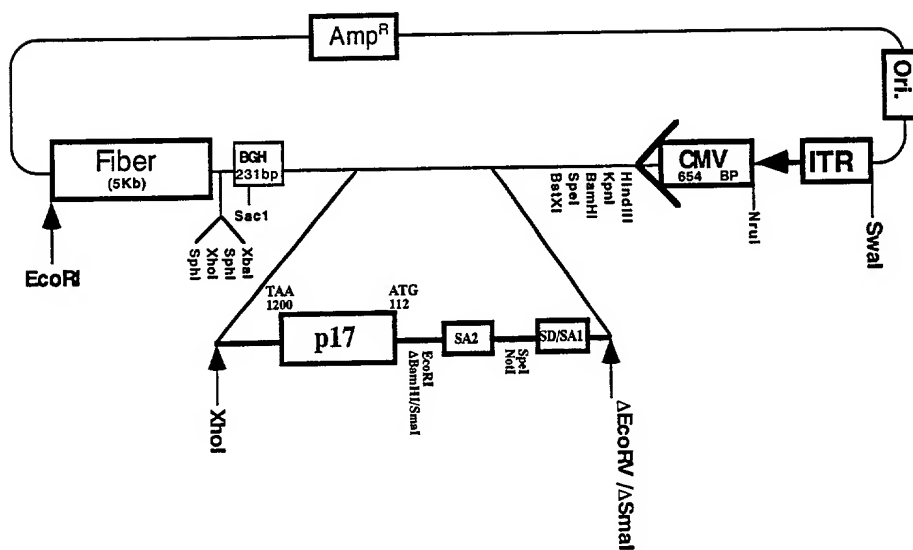
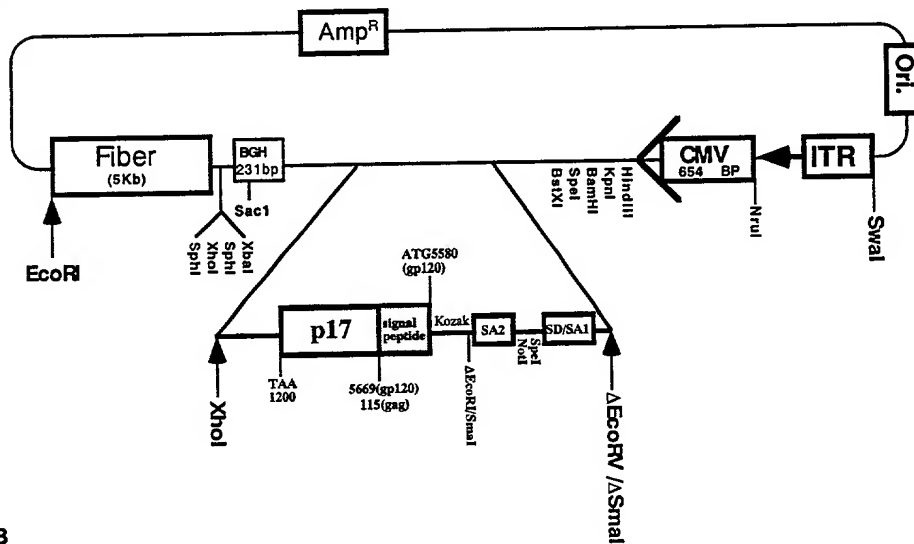


FIGURE 28

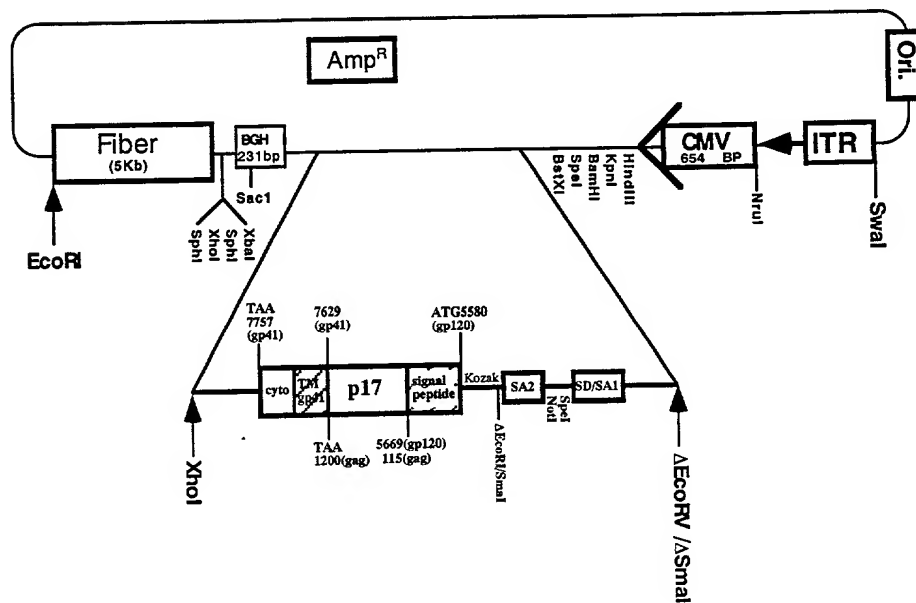
A. pRAd.ORF6-p17



B. pRAd.ORF6-p17sec



C. pRAd.ORF6-p17MB



Variable	Mean	SD	Min	Max
Age	34.5	10.2	18	65
Gender	1.2	0.4	1	2
Marital status	1.5	0.5	1	3
Education	12.5	1.5	9	16
Income	1.8	0.8	1	3
Occupation	1.5	0.5	1	3
Health status	1.5	0.5	1	3
Stress level	2.5	0.8	1	4
Life satisfaction	3.5	0.8	1	5
Work-life balance	2.5	0.8	1	4
Family support	1.5	0.5	1	3
Community support	1.5	0.5	1	3
Healthcare access	1.5	0.5	1	3
Quality of life	3.5	0.8	1	5
Overall well-being	3.5	0.8	1	5

**C. pRAd. ORF6-p24 MB**

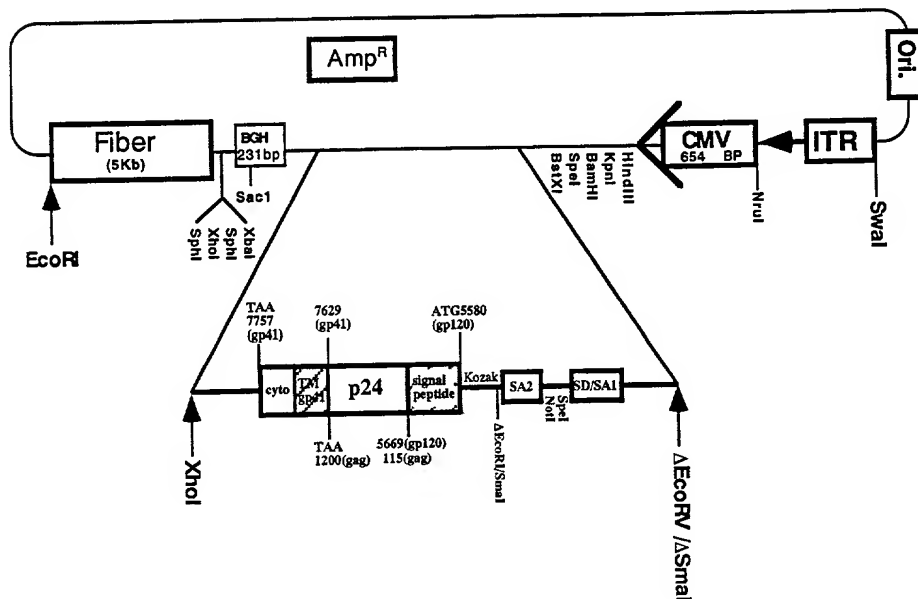


FIGURE 30 Adenoviral construct of Ad-E<sup>m</sup>.V3<sup>m</sup>/p17/24MB

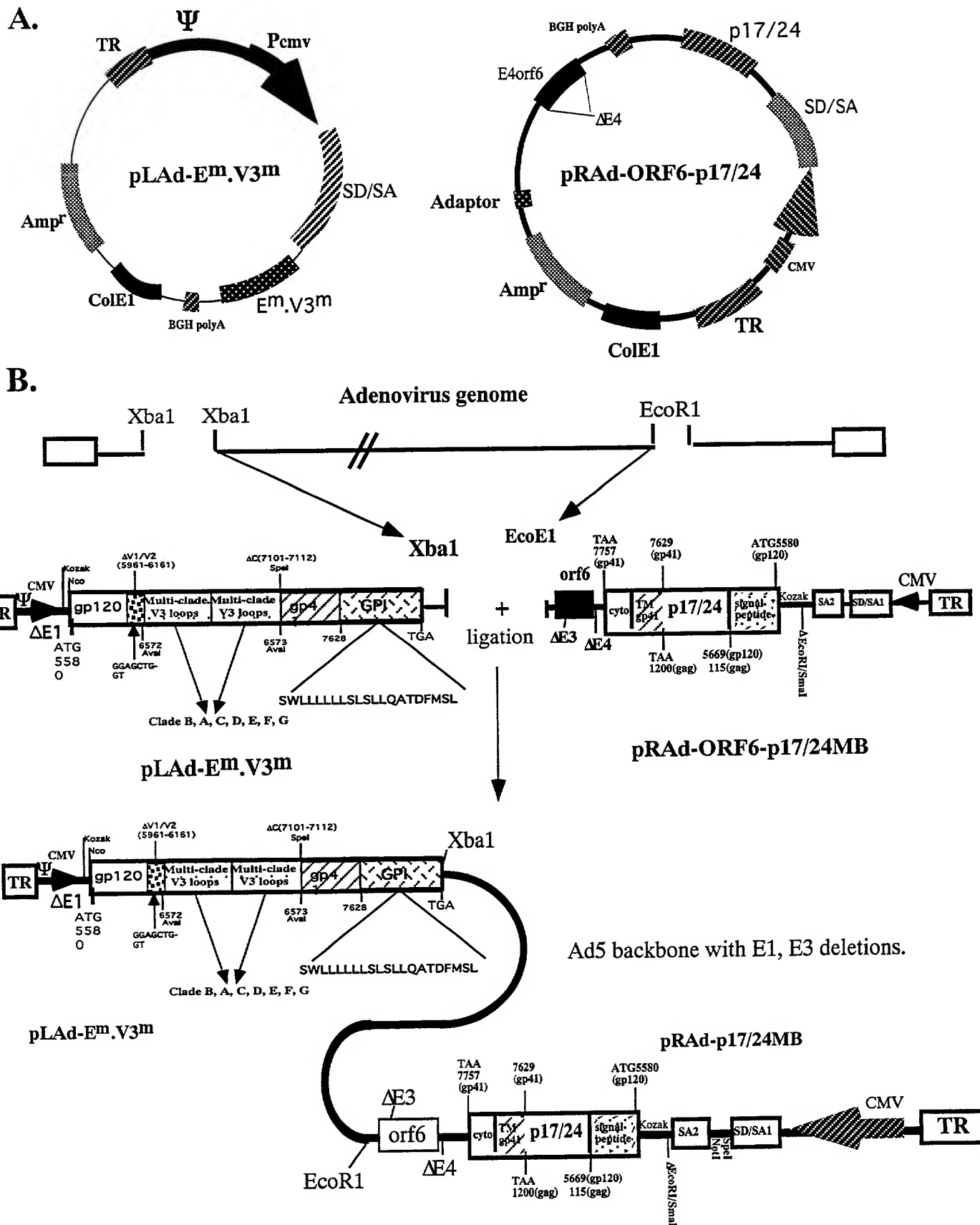
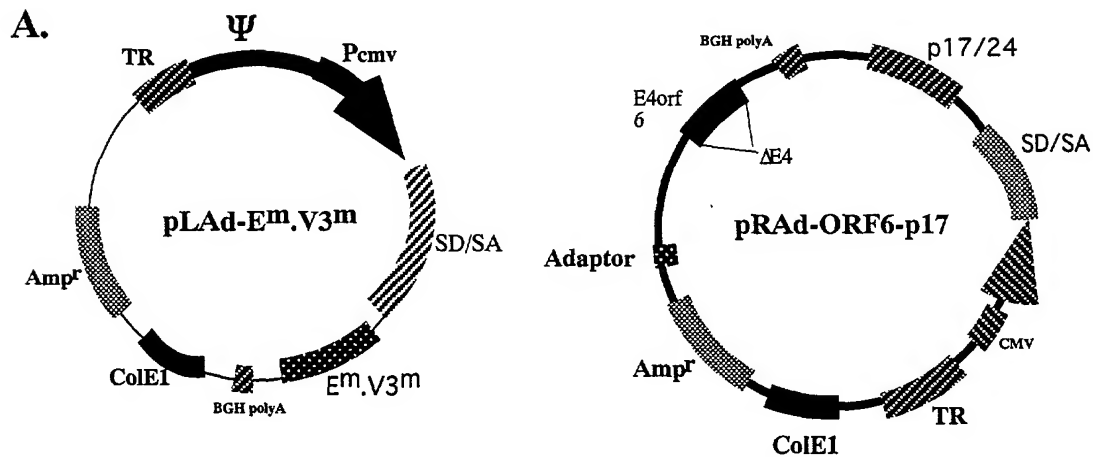


FIGURE 31 Adenoviral construct of Ad-E<sup>m</sup>.V3<sup>m</sup>/p17MB



**B.**

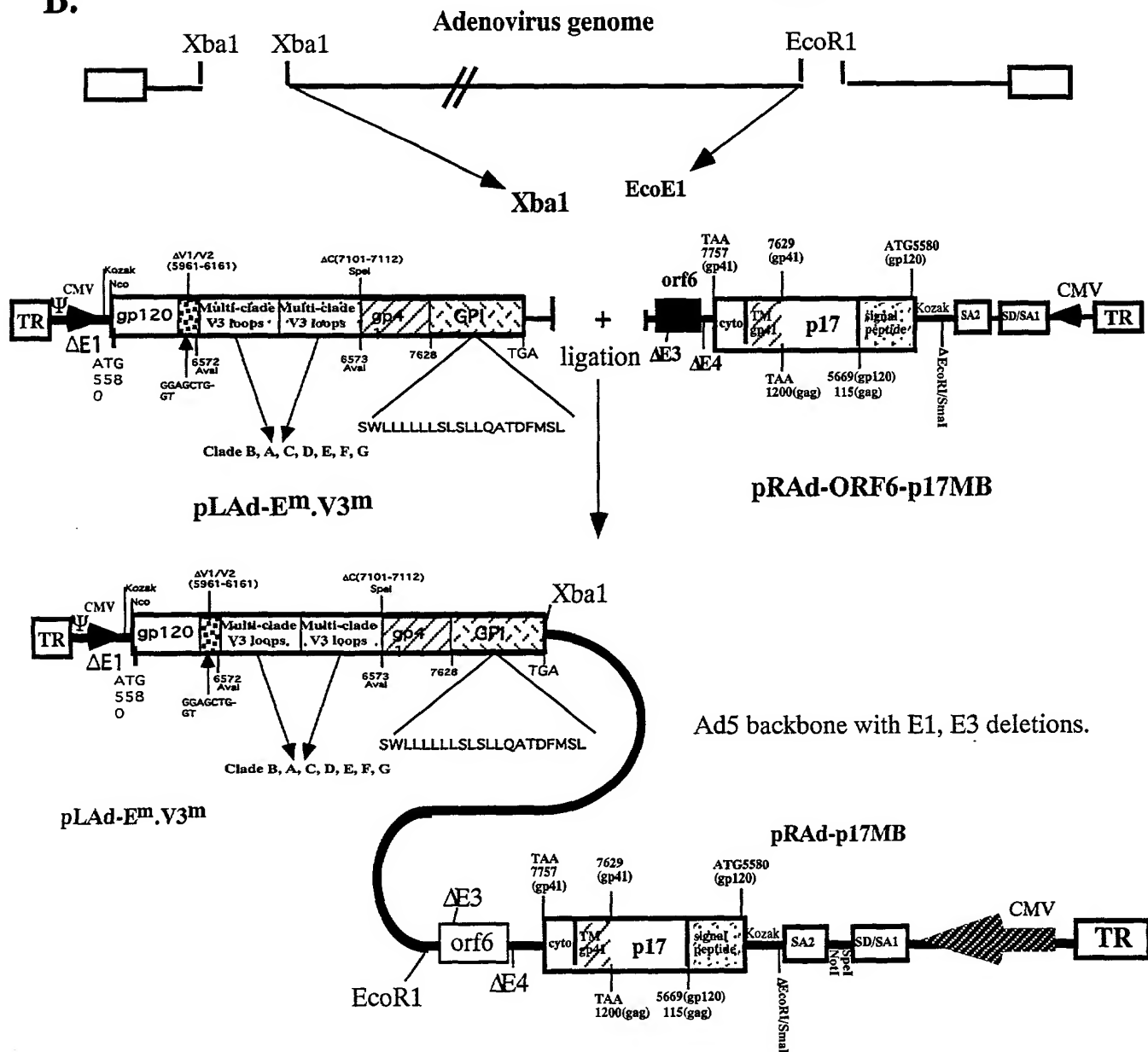
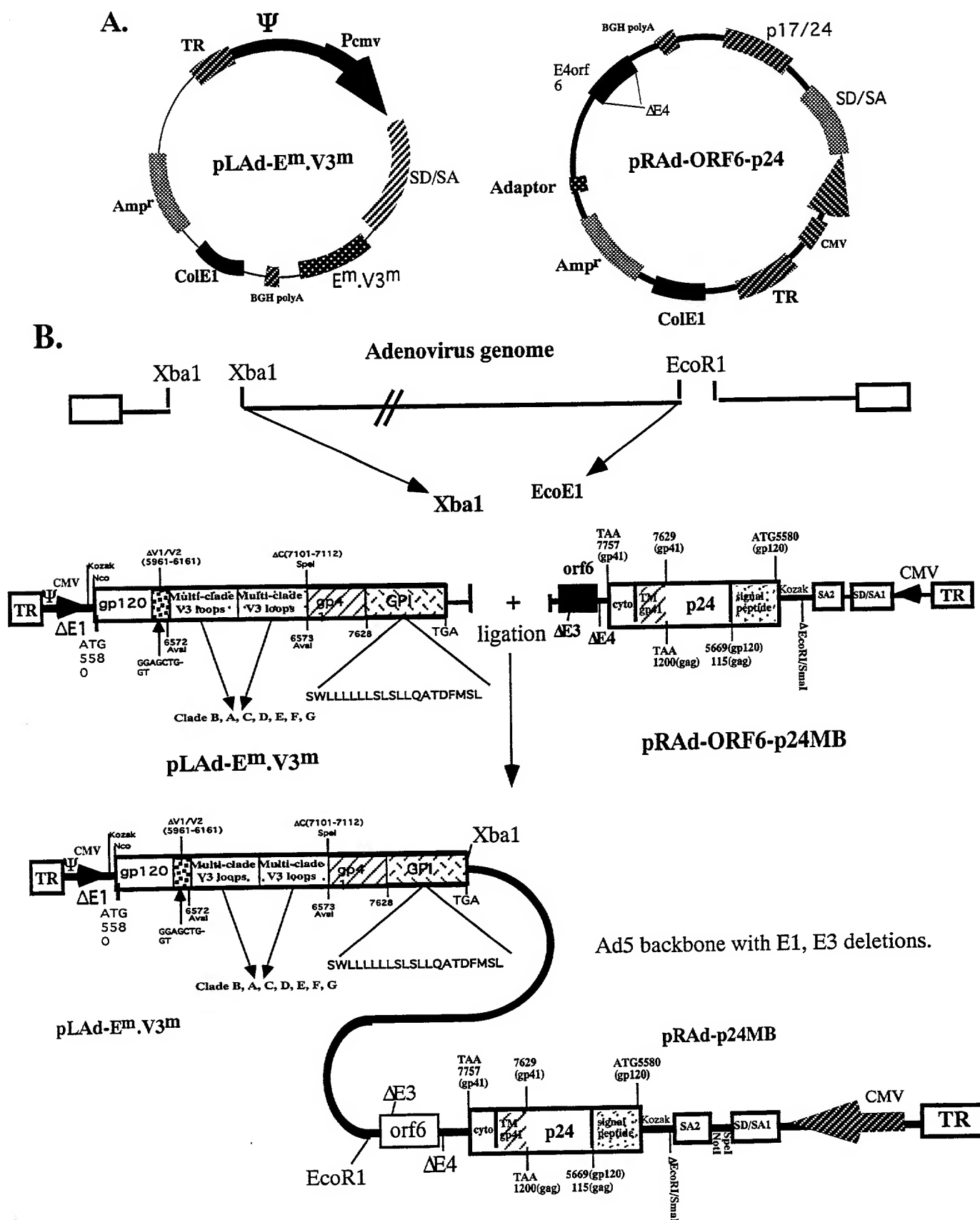


FIGURE 32 Adenoviral construct of Ad-Em.V3m/p24MB



Variable	Mean	SD	Min	Max
Age	35.5	11.5	18	65
Gender	1.0	0.0	0	1
Education	12.5	1.5	9	16
Marital status	1.0	0.0	0	1
Income	1.0	0.0	0	1
Health status	1.0	0.0	0	1
Employment status	1.0	0.0	0	1
Family size	2.5	1.5	1	6
Home ownership	1.0	0.0	0	1
Auto ownership	1.0	0.0	0	1
Life satisfaction	4.5	1.5	1	7
Health satisfaction	4.5	1.5	1	7
Financial satisfaction	4.5	1.5	1	7
Relationship satisfaction	4.5	1.5	1	7
Community satisfaction	4.5	1.5	1	7
Environment satisfaction	4.5	1.5	1	7
Security satisfaction	4.5	1.5	1	7
Quality of life	4.5	1.5	1	7
Life expectancy	75.0	5.0	60	90
Health expectancy	60.0	5.0	45	75
Disability expectancy	15.0	5.0	0	30
Life expectancy at age 65	15.0	5.0	0	30
Health expectancy at age 65	10.0	5.0	0	20
Disability expectancy at age 65	5.0	5.0	0	15
Life expectancy at age 75	10.0	5.0	0	20
Health expectancy at age 75	7.0	5.0	0	15
Disability expectancy at age 75	3.0	5.0	0	10
Life expectancy at age 85	5.0	5.0	0	10
Health expectancy at age 85	3.0	5.0	0	10
Disability expectancy at age 85	2.0	5.0	0	10
Life expectancy at age 95	2.0	5.0	0	10
Health expectancy at age 95	1.0	5.0	0	10
Disability expectancy at age 95	1.0	5.0	0	10
Life expectancy at age 105	1.0	5.0	0	10
Health expectancy at age 105	0.5	5.0	0	10
Disability expectancy at age 105	0.5	5.0	0	10

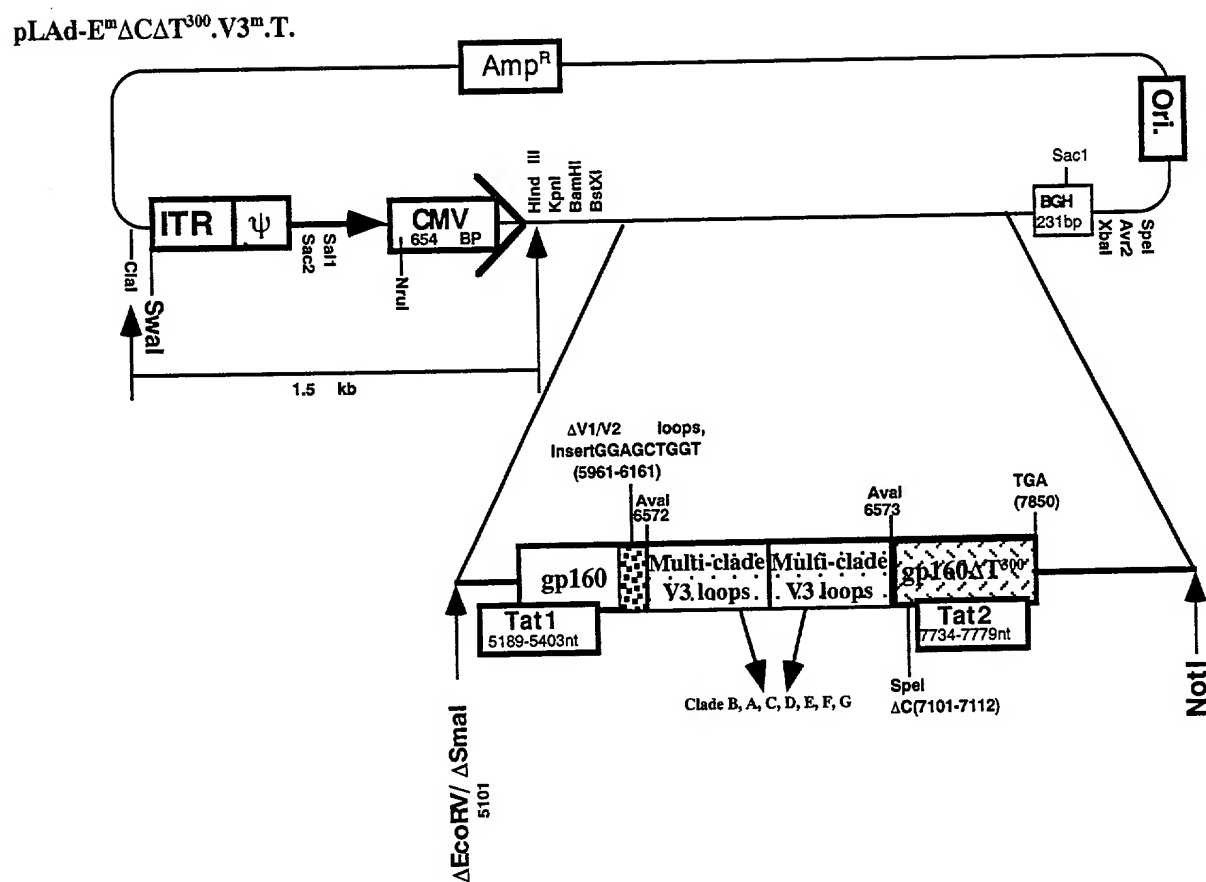
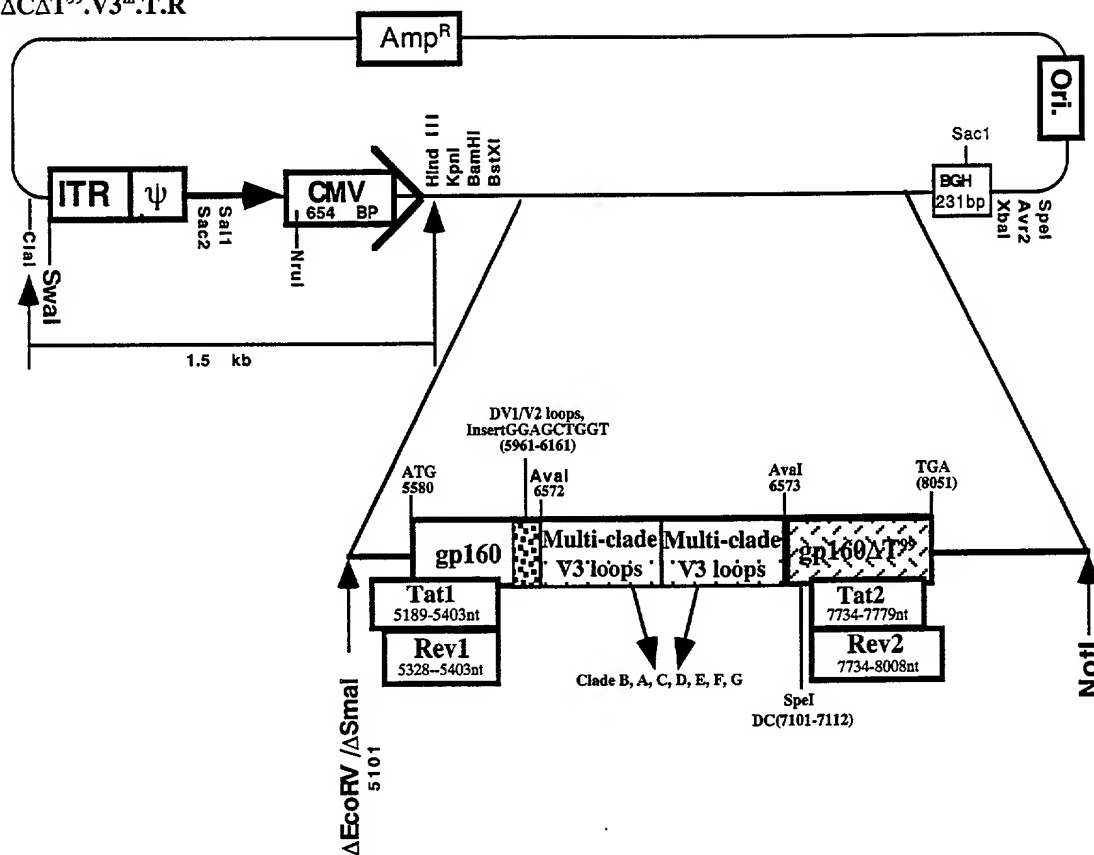


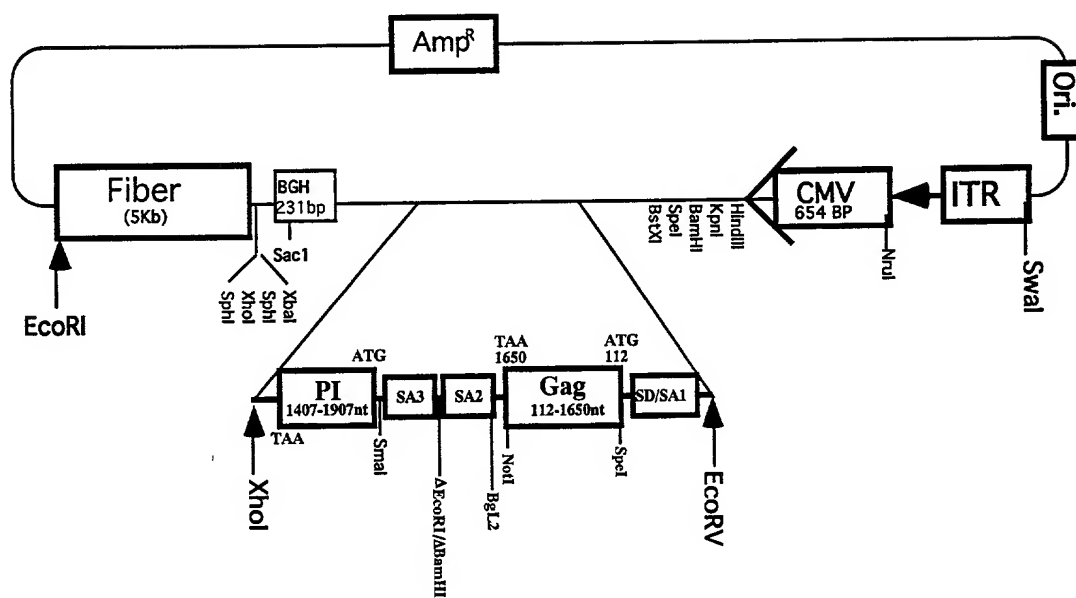
FIGURE 34

pLAd-E<sup>m</sup>ΔCAT<sup>99</sup>.V3<sup>m</sup>.T.R



pRAAd. ORF6-G.PI

FIGURE 35



**pRAd.ORF6-G-PI**

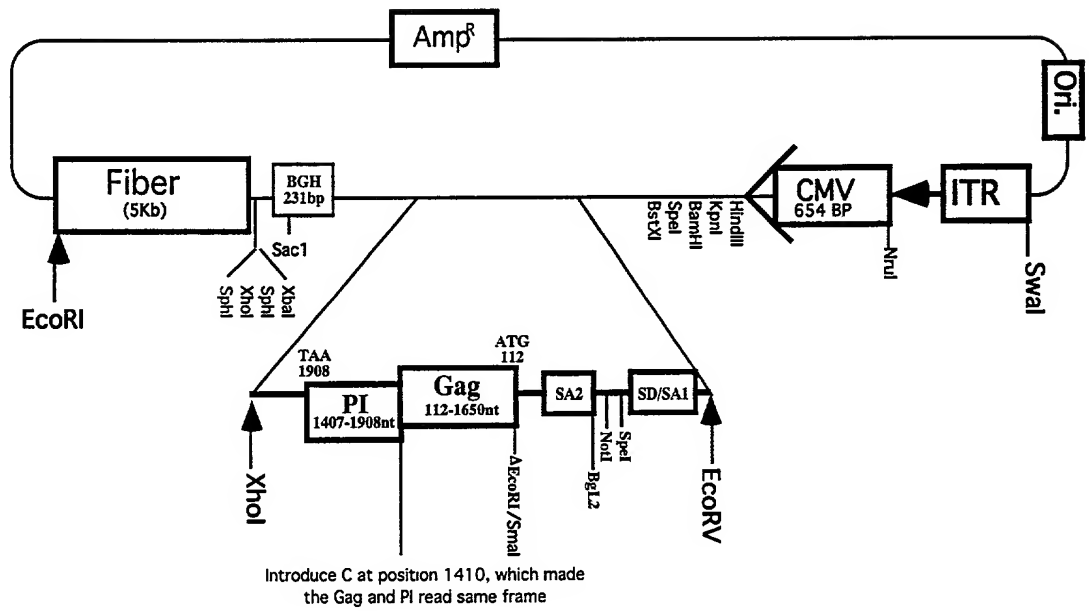
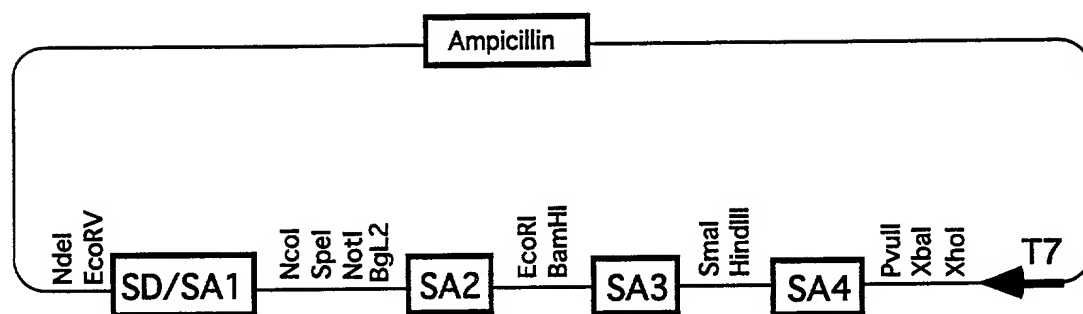


FIGURE 37

SD/SA1.2.3 vector



## FIGURE 38

### DNA Sequence of Env/Tat/Rev from BH10 clone [SEQ ID NO: 14]:

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacat

EcoRI

agcagaataggcgttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctgga  
agcatccaggaagtcagcctaaaactgcttgtaaccaattgctattgtaaaaagtgttgctttcattgccaa  
gtttgtttcatacaaaaagccttaggcatctcctatggcaggaagaagcggagacagcgacgaagacctcc  
tcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtacatgtaatgcaacctatacaaa  
tagcaatagtagcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatat  
aggaaaatattaagacaaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagacagtgg  
caatgagagtggaaggagaaatatcagcacttgtggagatgggggtggagatggggcaccatgctccttggg  
atgttgatgatctgtagtgctacagaaaaattgtgggtcacagtctattatggggtagctgtgtggaagga  
agcaaccaccactctattttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggcca  
cacatgcctgtgtacccacagaccccaaccacagaagtagtatttgtaaatgtgacagaaaaattttaac  
atgtggaaaaatgacatggttagaacagatgcatgaggatataatcagtttatgggatcaaaagcctaaagcc  
atgtgtaaaaattaaccccactctgtgttagtttaaaagtgcactgatttgaagaatgataactaataccaata  
gtagtagcgggagaatgataatggagaaaggagagataaaaaactgctctttcaatatcagcacaagcata  
agaggttaaggtgcagaaagaatatgcattttttataaacttgatataataccaatagataatgatactac  
cagctatacgttgacaagttgtaaacacctcagtcattacacaggcctgtccaaaggatatcctttgagccaa  
ttcccatacattattgtgccccggctggttttgcgattctaaaatgtaataataagacgttcaatggaaca  
ggaccatgtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgct  
gttaaatggcagtcctggcagaagaagaggtagtaattagatctgccaatttcacagacaatgctaaaacca  
taatagtacagctgaaccaatctgtagaaattaattgtacaagacccaacaacaatacaagaaaaagtatc  
cgtatccagagaggaccaggagagcatttgttacaataggaaaaataggaaatatgagacaagcacattg  
taacattagtagagcaaaatggaataaacactttaaaacagatagatagcaaatgaagagaacaatttgga  
ataataaaacaataatctttaagcagtcctcaggaggggaccagaaattgtaacgcacagttttaattgt  
ggaggggaatttttctactgtaattcaacacaactgtttaatagtacttggtttaatagtacttggaagta  
ctaaagggtcaaataacactgaagggaagtgcacacatcacctcccagcagaataaaacaaattataaac  
atgtggcaggaagtaggaaaagcaatgtatgcccctcccatcagtggaacaaattagatgttcatcaaatat  
tacagggtctgtattaacaagagatggtggaatagcaacaatgagtcagagatcttcagacctggaggag  
gagatatgagggacaattggagaagtgaattatataaatataaagtagtaaaaattgaaccattaggagta  
gcaccaccaaggcaaagagaagagtggtgcagagagaaaaagagcagtggaataggagctttgttcct  
tgggttcttgggagcagcaggaagcactatgggcgcagcgtcaatgacgtgacggtacaggccagacaat  
tattgtctggtatagtgcagcagcagaacaatttgcagggctattgagggcgaacagcatctgttgcaa  
ctcacagtcctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaaggatcaaca  
gctcctggggatttgggggtgctctggaaaactcatttgcaccactgctgtgccttggaatgctagttgga  
gtaataaatctctggaacagatttgaataacatgacctggatggagtgggacagagaaattaacaattac  
acaagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattgga  
attagataaatgggcaagtttgtggaattgggttaacataacaaattggctgtggtatataaaattattca  
taatgatagtaggaggcttggttaggtttaagaatagtttttgcgtgactttctgtagtgaatagagttagg  
cagggatattcaccattatcgtttcagacccacctcccaatcccagggggacccgacaggcccgaaaggaat  
agaagaagaaggtggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatct  
gggacgatctgcggagcctgtgcctctcagctaccaccgcttgagagacttactcttgattgtaacgagg  
attgtggaacttctgggacgcagggggtgggaagccctcaaatattggtggaatctcctacagtattggag  
tcaggagctaaagaatagtgcgtttagcttgcctcaatgccacagctatagcagtagctgaggggacagata  
gggttatagaagtagtacaaggagcttatagagctattcgccacatacctagaagaataagacagggcttg  
gaaaggattttgctataagatgggtggcaagtgggtcaaaaagttagtggttgatggcctgctgtaaggg  
aaagaatgagacgagctgagccagcagcagatgggggtgggagcagcatctcgag

XhoI

## FIGURE 39

### **DNA Sequence of IL-2ΔX [SEQ ID NO: 15]:**

Tcactctctttaatcactactcacagtaacctcaactcctgccacaatgta  
caggatgcaactcctgtcttgcattgcactaagtcttgcacttgtcacaaa  
cagtgcacctacttcaagttctacaaagaaaacacagctacaactggagca  
tttactgctggatttacagatgattttgaatggaattaataattacaagaa  
tcccaaactcaccaggatgctcacatttaagttttacatgcccagaaggc  
cacagaactgaaacatcttcagtggtcttgaagaagaactcaaactctgga

ΔXbaI (cta → ctt)

ggaagtgctaaatttagctcaaagcaaaaactttcacttaagacccagggg  
cttaatcagcaatatcaacgtaatagttctggaactaaagggatctgaaac  
aacattcatgtgtgaatatgctgatgagacagcaaccattgtagaatttct  
gaacagatggattaccttttgtcaaagcatcatctcaacactaacttga

## FIGURE 40

### DNA Sequence of Env<sup>m</sup>ΔCAT<sup>300</sup> (HIV strain BH10) [SEQ ID NO: 16]:

**Gaattc**gccacccatggggagtgaaggagaaatatcagcacttgtggagatg

EcoRI Kozak NcoI

gggggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgctacagaaaaa  
ttgtgggtcacagtctattatggggtacctgtgtggaaggaagcaaccaccactctat  
gtgcatcagatgctaaagcatatgatacagaggtacataaatgtttgggccacacatgcctg  
tgtaccacagaccccaaccacaagaagtagtattggtaaagtgtgacagaaaattttaac  
atgtggaaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaa  
gcctaaagccatgtgtaaaattaacccactctgtgttagtttaaagtgcactgatttgaa  
gaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa  
aactgctctttcaatatcagcacaagcataagaggtaagggtgcagaaagaatatgcatttt  
ttataaaacttgatataataccaatagataatgatactaccagctatacgttgacaagttg  
taacacctcagtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacat  
tattgtgccccggctgggttttgcgattctaaaatgtaataataagacgttcaatggaacag  
gacatgtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaac  
tcaactgctgttaaattggcagctctggcagaagaagaggtagtaattagatctgccaatttc  
acagacaatgctaaaaccataatagtagcagctgaaccaatctgtagaaattaattgtacaa  
gacccaacaacaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttgt  
tacaataggaaaaataggaaatatgagacaagcacattgtaacattagtagagcaaaatgg  
aataacactttaaaacagatagatagcaaattaagagaacaatttggaaataataaaacaa  
taatctttaagcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgtgg  
aggggaatttttctactgtaattcaacacaactgtttaatagtacttgggttaatagtact  
tggagtactaaaggtcaaataacactgaaggaagtgcacaaatcaccctcccatgcagaa  
taaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgcccctcccatcag  
tggacaaattagatgttcatcaaatattacagggctgctattaacaagagatgggtggtaat  
agcaacaatgagtcagagatcttcagacctggaggaggagatatgagggacaattggagaa  
gtgaattatataaatataaagtagtaaaaattgaaccattaggagtagcaccaccaaaggc  
aaagagaagagtggtgcagACTAGTgcagtggggaataggagctt

ΔCleavage site(**agagaaaaaaga**) →SpeI

tgttccttgggttcttgggagcagcaggaagcactatgggcgagcgtcaatgacgctgac  
ggtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgcctgagggt  
attgaggcgcaacagcatctgttgcaactcacagctctggggcatcaagcagctccaggcaa  
gaatcctggctgtggaaagatacctaaggatcaacagctcctggggatttgggggttgctc  
tggaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatctctg  
gaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacacaa  
gcttaatacactccttaattgaagaatcgcaaaaccagcaagaaagaatgaacaagaatt  
attggaattagataaatgggcaagtttgtggaattgggttaacataacaaattggctgtgg  
tatataaaattattcataatgatagtaggaggttggtaggtttaagaatagtttttgcctg  
tactttctgtagtgaatagagttaggcagggatattcaccattatcgtttcagacccacct  
cccaatcccgaggggacccgacaggcccgaaaggaatagaagaagaagggtggagagagagac  
agagacagatccattcgattagtgaacggatccttagcacttatctggtaa

## **FIGURE 41A**

### **DNA Sequence of Full length HIV-1 Gag [SEQ ID NO: 17]:**

ggctagaaggagagagaggatgggtgcgagagcgtcagtattaagcgggggag  
aattagatcgatgggaaaaaatttcggttaaggccaggggggaaagaaaaaat  
ataaattaaaacatatagtatgggcaagcaggagctagaacgactacaac  
catcccttcagacaggatcagaagaacttagatcattatataatacagtag  
caaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaag  
ctttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagc  
aagcagcagctgacacaggacacagcagtcaggtcagccaaaattacccta  
tagtgcagaacatccaggggcaaattggtacatcaggccatatcacctagaa  
ctttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaag  
taatacccatgttttcagcattatcagaaggagccaccccacaagatttaa  
acaccatgctaaacacagtggggggacatcaagcagccatgcaaatgttaa  
aagagaccatcaatgaggaagctgcagaatgggatagagtacatccagtgc  
atgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgaca  
tagcaggaactactagtacccttcagggaacaaataggatggatgacaaata  
atccacctatcccagtaggagaaatttataaaagatggataatcctgggat  
taaataaaaatagtaagaatgtatagccctaccagcatttctggacataagac  
aaggaccaaagaaccttttagagactatgtagaccggttctataaaactc  
taagagccgagcaagcttcacaggaggtaaaaaattggatgacagaaacct  
tggttggtccaaaatgcgaaccagattgtaagactattttaaagcattgg  
gaccagcggctacactagaagaaatgatgacagcatgtcagggagtaggag  
gacccggccataaggcaagagttttggctgaagcaatgagccaagtaacaa  
atacagctaccataatgatgcagagaggcaatttttaggaaccaagaaaga  
tggttaagtgtttcaattgttggaagaagggcacacagccagaaattgca  
gggcccctaggaaaaagggtgttggaatgtggaaaggaaggacaccaa  
tgaaagattgtactgagagacaggctaatttttttagggaagatctggcctt  
cctacaaggggaaggccagggaattttcttcagagcagaccagagccaacag  
ccccaccattttcttcagagcagaccagagccaacagccccaccagaagaga  
gcttcagggtctggggtagagacaacaactccccctcagaagcaggagccga  
tagacaaggaactgtatcctttaacttcctcagatcactctttggcaacg  
accctcgtcacataa

## FIGURE 41B

### Amino Acid Sequence of HIV-1 (Strain BH10) Gag [SEQ ID NO: 18]:

M	G	A	R	A	S	V	L	S	G	G	E	L	D	R	W	E	K
I	R	L	R	P	G	G	K	K	K	Y	K	L	K	H	I	V	W
A	S	R	E	L	E	R	L	Q	P	S	L	Q	T	G	S	E	E
L	R	S	L	Y	N	T	V	A	T	L	Y	C	V	H	Q	R	I
E	I	K	D	T	K	E	A	L	D	K	I	E	E	E	Q	N	K
S	K	K	K	A	Q	Q	A	A	A	D	T	G	H	S	S	Q	V
S	Q	N	Y	P	I	V	Q	N	I	Q	G	Q	M	V	H	Q	A
I	S	P	R	T	L	N	A	W	V	K	V	V	E	E	K	A	F
S	P	E	V	I	P	M	F	S	A	L	S	E	G	A	T	P	Q
D	L	N	T	M	L	N	E	V	G	G	H	Q	A	A	M	Q	M
L	K	E	T	I	N	E	E	A	A	E	W	D	R	V	H	P	V
H	A	G	P	I	A	P	G	Q	M	R	E	P	R	G	S	D	I
A	G	T	T	S	T	L	Q	E	Q	I	G	W	M	T	N	N	P
P	I	P	V	G	E	I	Y	K	R	I	I	I	L	G	L	N	K
I	V	R	M	Y	S	P	T	S	I	L	D	I	R	Q	N	P	Q
E	P	F	R	D	Y	V	D	R	F	Y	K	T	L	V	A	E	A
A	S	Q	E	V	K	N	W	M	T	E	T	L	L	A	Q	N	A
N	P	D	C	A	T	I	L	K	A	L	G	P	A	A	T	L	E
E	M	M	T	M	C	Q	G	V	G	G	P	G	H	K	A	R	V
L	A	E	A	N	S	Q	V	T	N	T	A	T	I	M	M	Q	R
G	N	F	R	N	N	R	K	M	V	K	C	F	N	C	G	K	E
G	K	T	A	H	Q	C	R	A	P	R	K	K	Q	C	W	K	C
G	K	E	G	P	S	M	K	D	C	T	E	R	F	A	N	F	L
P	E	P	T	A	P	Y	K	G	R	P	G	N	P	L	Q	S	R
P	E	P	S	F	R	P	F	L	Q	S	T	T	R	P	T	A	P
E	P	I	D	K	E	S	Y	V	E	T	S	L	S	S	Q	K	Q
N	D	P	S	S	Q	*									L	F	G

FOOTNOTES

## FIGURE 42

### DNA Sequence of E<sup>m</sup>ΔCAT<sup>99</sup>.T.R (HIV strain pNL4-3) [SEQ ID NO: 19]:

Gaatttctgcaacaactgctgtttatccatttcagaattgggtgtcgacatag

EcoRI

cagaataggcggttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctggaagca  
tccaggaagtcagcctaaaactgcttgtaccaattgctattgtaaaaagtggtgctttcattgccagtttgt  
ttcatgacaaaagccttaggcattctcctatggcaggaagaagcggagacagcgacgaagagctcatcagaaca  
gtcagactcatcaagcttctctatcaaagcagtaagtgtacatgtaatgcaacctataatagtagcaatagt  
agcatttagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaaatatta  
agacaaagaaaaatagacagggttaattgatagactaatagaaagagcagaagacagtggtgaatgagagtgaag  
gagaagtatcagcacttgtggagatgggggtgaaatggggcaccatgctccttgggatattgatgatctgta  
gtgtacagaaaaattgtgggtcacagtctattatggggctacgtgtgtggaagggaagcaaccaccactctatt  
ttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgctgtgtaccaca  
gaccccaaccacacaagaagtagtattggtaaatgtgacagaaaattttaacatgtggaaaaatgacatggttag  
aacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccatgtgtataaattaacccactctg  
tgtagtttaaaagtgcactgatttgaagaatgatactaataccaatagtagtagcgggagaatgataatggag  
aaaggagagataaaaaactgctctttcaatatcagcacaagcataaagagataaggtgcagaaagaatatgcat  
tcttttataaaacttgatatagtagtaaccaatagataatacca

gctataggttgataagttgtaacacctcagtcattacacaggcctgtccaaaggatcctttgagccaattcc  
catacattattgtgccccggtggttttgcgattctaaaatgtaataataagacgttcaatggaacaggacca  
tgtacaaatgtcagcacagtagcaatgtacacatggaatcaggccagtagtatcaactcaactgctgttaaagt  
gcagtcctagcagaagaagatgtagtaattagatctgccaaatttcacagacaatgctaaaaccataatagtaca  
gctgaacacatctgtagaaattaattgtacaagacccaacaacaatacaagaaaaagtagcgtatccgagagg  
ggaccaggaggagagcatttgttacaataggaaaaataggaaatagagacaagcacattgtaacattagtagag  
caaaatggaatgccacttttaaaacagatagctagcaaatgaagagaacaatttggaaataataaaacaataat  
ctttaagcaatcctcaggaggggacccagaaattgtaacgcacagttttaattgtggaggggaatttttctac  
tgtaattcaacacaactgtttaatagtacttggtttaatagtacttggagtactgaagggtcaaataacactg  
aaggaagtgcacacaatcacactcccatgcagaataaaacaatttataaacatgtggcaggaagtaggaaaagc  
aatgtatgccccctcccatcagtggaacaaattagatgttcatcaaatattactgggctgctattaacaagagat  
gggtggaataacaacaatgggtccgagatcttcagacctggaggaggcgatatgagggacaattggagaagtg  
aattatataaatataaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaaagagaagagtggg  
gcagACTAGTgcagtggaataggagctttgttccttg

ΔCleavage site (agagaaaaaga) → SpeI

ggttccttgggagcagcaggaagcactatgggctgcacgtcaatgacgctgacggtacaggccagacaattatt  
gtctgatatagtgacagcagcagaacaatttgcaggggtattgaggcgcaacagcatctgttgcaactcaca  
gtctggggcatcaaacagctccaggcaagaatcctggctgtggaaagatcctaaggatcaacagctcctgg  
ggatttgggggtgctctggaaaactcatttgcaccactgctgtgccttggatgctagttggagtaataaatc  
tctggaacagatttggaaataacatgacctggatggagtggaagacagagaaattaacaattacacaagcttaata  
cactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatggg  
caagtttgtggaattggtttaacataacaaattggctgtggtatataaaattattcataatgatagtaggagg  
cttggtaggtttaagaatagtttttgcgtgtactttctatagtgtaatagagttaggcagggaatttcaccatta  
tcgtttcagacccacctcccaatcccagggggacccgacagggcccgaagggaatagaagaagggtggagaga  
gagacagagacagatccattcgattagtgaaacggatccttagcacttatctgggacgatctgcggagcctgtg  
cctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcagg  
gggtgggaagccctcaaataattgggtggaatctcctacagtattggagtcaggaactaaagaatagtgtgtta  
acttgctcaatgccacagccatagcagtagctgagtaa

## FIGURE 43

DNA Sequence of E<sup>m</sup>ΔV<sub>12</sub>ΔCAT<sup>99</sup>.T.R (Strain pNL4-3) [SEQ ID NO: 20]:

Gaattctgcaacaactgctgtttatccatttcagaattgggtgtcgacatag

EcoRI

Cagaataggcgttactcgacagaggagagcaagaaatggagccagtagatcctagactagagccctggaagca  
tccaggaagtgcgcctaaaactgcttgaccaattgctattgtaaaaagtgttgctttcattgccagtttgt  
ttcatgacaaaagccttaggcatctcctatggcaggaagaagcggagacagcgacgaagagctcatcagaaca  
gtcagactcatcaagcttctctatcaaagcagtaagtagtacatgtaatgcaacctataatagtagcaatagt  
agcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaatatta  
agacaaagaaaaatagacaggttaattgatagactaatagaaaagcagagaagacagtggaatgagagtggaag  
gagaagtatcagcacttgtggagatgggggtgaaatggggcaccatgctccttgggatattgatgatctgta  
gtgctacagaaaaattgtgggtcacagtctattatggggtaacctgtgtggaaggaagcaaccaccactctatt  
ttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctgtgtaccaca  
gaccccaaccacagaagaagtagtattggtaaatgtgacagaaaattttaacatgtggaaaaatgacatggtag  
aacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaaattaacccaccctctg  
tggtt ΔV1 and V2 loops

Agttgtaacacctcagtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtg  
ccccggtgtgttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcag  
cacagtacaatgtacacatggaatcaggccagtagtatcaactcaactgctgttaaattggcagtcctagcagaa  
gaagatgtagtaattagatctgccaatccacagacaatgctaaaaccataatagtagcagctgaacacatctg  
tagaaattaattgtacaagacccaacaacaatacaagaaaaagtatccgtatccagaggggaccaggaggagagc  
atttgtttacaataggaaaaataggaaatatgagacaagcacattgtaacattagtagagcaaaatggaatgcc  
actttaaaacagatagctagcaaatgaagagaacaatttggaataataaaacaataatctttaagcaatcct  
caggaggggacccagaaattgtaacgcacagttttaattgtgagggtcaaataaacactgaagggaagtgcaca  
actgtttaatagtacttgggttaataagtacttggagtactgaagggtcaaataaacactgaagggaagtgcaca  
atcacactcccagtcagaataaaacaattttataaacatgtggcaggaagttaggaaaagcaatgtatgccctc  
ccatcagtggaacaaattagatgttcacaaatattactgggctgctattaacaagagatgggtggaataaaca  
caatgggtccgagatcttcagacctggaggaggcgatattgagggacaattggagaagtgaattatataaatat  
aaagtagtaaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtgggtgcagACTAGTgcag  
tgggaaataggagctttgttcccttgggttcttgggagca

ΔCleavage site (agagaaaaaaga) → SpeI

gcaggaagcactatgggctgcacgtcaatgacgctgacggtacaggccagacaattattgtctgatatagtgc  
agcagcagaacaatttgcaggggtattgaggcgcaacagcatctgttgcaactcacagtctggggcatcaa  
acagctccaggcaagaatcctggctgtggaagatacctaaaggatcaacagctcctggggatttgggggtgc  
tctggaaaactcatttgcaccactgctgtgccttggaatgctagttggagtaataaatctctggaacagattt  
ggaataacatgacctggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattga  
agaatcgcaaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaat  
tggtttaacataacaaattggctgtggtatataaaattattcataatgatagtaggaggttggtaggtttaa  
gaatagtttttgcgtgactttctatagtgaatagagtttaggcaggatattcaccattatcgtttcagacca  
cctcccaatcccaggggacccgcagggcccgaaggaatagaagaagaaggtggagagagagacagagacaga  
tccattcgattagtgaacggatccttagcacttatctgggacgatctgcggagcctgtgcctcttcagctacc  
accgcttgagagacttactcttgattgtaacgaggttgtggaacttctgggacgcaggggtgggaagccct  
caaatattgggtggaatctcctacagttattggagtcaggaactaaagaatagtgtgttaacttgcctcaatgcc  
acagccatagcagtagctgagtaa

## FIGURE 44

### DNA Sequence of Env<sup>m</sup>ΔC.T.R.N (Strain BH10) [SEQ ID NO: 21]:

Gaattctgcaacaactgctggttatccattttcagaattgggtgtcgacat

EcoRI

agcagaataggcggtactcgacagaggagagcaagaatggagccagtagatcctagactagagccctgga  
agcatccaggaagtcagcctaaaactgcttgtagcaattgctattgtaaaaagtgttgctttcattgcca  
gtttgtttcataacaaaagccttaggcatctcctatggcaggaagaagcggagacagcgacgaagacctcc  
tcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtacatgtaatgcaacctatacaaa  
tagcaatagtagcattagtagtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatat  
aggaaaatattaagacaaagaaaaatagacaggttaattgatagactaatagaaagagcagaagacagtgg  
caatgagagtgaaggagaaatatcagcacttggtggagatgggggtggagatggggcaccatgctccttggg  
atgttgatgatctgtagtgtctacagaaaaattgtgggtcacagtctattatgggggtacctgtgtggaagga  
agcaaccaccactctattttgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggcca  
cacatgcctgtgtacccacagaccccaaccacaagaagtagtattggtaaattgtgacagaaaaattttaac  
atgtggaaaaatgacatggttagaacagatgcatgaggatataatcagtttatgggatcaaagcctaaagcc  
atgtgtaaaaattaacccactctgtgttagtttaagtgactgatttgaagaatgataactaataccaata  
gtagtagcgggagaatgataatggagaaaggagagataaaaaactgctctttcaatatcagcacaagcata  
agaggttaaggtgcagaaagaatatgcattttttataaaacttgatataataccaatagataatgatactac  
cagctatacgttgacaagttgtaacacctcagtcattacacaggcctgtccaaaggtatcctttgagccaa  
ttcccatacattattgtgccccggtggttttgcatctaaaatgtaataataagacgttcaatggaaca  
ggaccatgtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgct  
gttaaattggcagctctggcagaagaagaggtagtaattagatctgccaatttcacagacaattgctaaaacca  
taatagtcacagctgaaccaatctgtagaatttaattgtacaagaccaacaacaatacaagaaaaagtatc  
cgtatccagagaggaccagggagagcattttgttacaataggaaaaataggaaatatgagacaagcacattg  
taacattagtagagcaaaatggaataacacttttaaacagatagatagcaaattaagagaacaatttgga  
ataataaaacaataatctttaagcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgt  
ggaggggaatttttctactgtaattcaacacaactgtttaatagtacttgggttaatagtacttggagtac  
taaaggggtcaaataacactgaaggaagtgcacaaatcacctcccatgcagaataaaacaaattataaaca  
tgtggcaggaagttaggaaaagcaatgtatgccctcccatcagtggaacaaattagatgttcatcaaatatt  
acagggctgctattaacaagagatggtggtaatagcaacaatgagtcagagatcttcagacctggaggagg  
agatatgagggacaattggagaagtgaattatataaatataaagtagtaaaaattgaaccattaggagtag  
caccaccaaggcaaagagaagagtggtgcagACTAGTgcagtggaataggagctttgttccttgggttc  
t

ΔCleavage site (agagaaaaaga)→SpeI

tgggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacggtacaggccagacaattattgtct  
ggtatagtgcagcagcagaacaatttgctgagggctattgaggcgcaacagcatctgttgcaactcacagt  
ctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaaggatcaacagctcctgg  
ggatttgggggtgctctggaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaa  
tctctggaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacacaagctt  
aatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagata  
aatgggcaagtttgggaattgggttaacataacaaattggctgtggtatataaaattattcataatgata  
gtaggaggcttggtaggtttaagaatagtttttgcgtgactttctgtagtgaatagagttaggcagggata  
ttcaccattatcgtttcagacccacctcccaatcccgaggggacccgacaggccgaaggaatagaagaag  
aaggtggagagagagacagagacagatccattcgattagtgaaacggatccttagcaattatctgggacgat  
ctgcggagcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggattgtgga  
acttctgggacgcaggggggtgggaagccctcaaataattgggtggaatctcctacagtattggagtccaggagc  
taaagaatagtgtgttagcttgcctcaatgccacagctatagcagtagctgaggggacagataggggtata  
gaagtagtacaaggagcttatagagctattcgccacatacctagaagaataagacagggccttggaaaggat  
tttgcctataagatgggtggcaagtgggtcaaaaagtagtgtggttgatggcctgctgtaagggaaagaatg  
agacgagctgagccagcagcagatgggggtgggagcagcatctcgagacctagaaaaacatggagcaatcac  
aagtagcaacacagcagctaacaatgctgattgtgcctggctagaagcacaagaggaggaggaggtgggtt  
ttccagtcacacctcaggtacctttaagaccaatgacttacaaggcagctgtagatcttagccacttttta  
aaagaaaaggggggactggaagggctaattcactcccaacgaagacaagatatccttgatctgtggatcta  
ccacacacaaggctacttcctgatttag

## FIGURE 45

### DNA Sequence of E<sup>m</sup>ΔC.N (Strain BH10) [SEQ ID NO: 22]:

Gaattcgccaccatgggagtgaggagaaatatcagcacttgtggagatgg

EcoRI Kozak NcoI

gggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcac  
agtctattatgggtacctgtgtggaagggaagcaaccaccactctattttgtgcatcagatgctaaagcat  
atgatacagaggtacataatgtttgggccacacatgcctgtgtacccaagaccccaaccacaagaagta  
gtattggtaaattgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgaggatat  
aatcagtttatgggatcaaagcctaaagccatgtgtaaaattaaccccactctgtgttagtttaaagtga  
ctgatttgaagaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaa  
aactgctctttcaatatcagcacaagcataagaggtgaaggtgcagaaagaatatgcatttttttataaact  
tgatataataccaatagataatgatactaccagctatacgttgacaagttgtaaacacctcagtcattacac  
aggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccggctgggttttgcgattcta  
aaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtagacaatgtacacatgg  
aattaggccagtagtatcaactcaactgctgttaaattggcagtcctggcagaagaagaggtagtaattagat  
ctgccaaatttcacagacaatgctaaaaccataatagtagacgtgaaccaatctgtagaatttaattgtaca  
agaccaacaacaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttgttacaatagg  
aaaaataggaatatgagacaagcacattgtaacattagtagagcaaaatggaataacacttttaaacaga  
tagatagcaaatgaagaacaatttggaaataataaaacaataatctttaagcagtcctcaggaggggac  
ccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaa  
tagtacttgggttaatagtacttggagtactaaagggtcaaataacactgaagggaagtgcacacaatcacc  
tcccatgcagaataaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgccccctccatc  
agtggaacaattagatgttcacatcaaatattacagggctgctattaacaagagatgggtggaatagcaaca  
tgagtcagagatcttcagacctggaggaggagataggggacaattggagaagtgaattatataaatata  
aagtagtaaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcagACTAGTgca  
gtgggaataggagctttgttccttgggttcttggggagc

ΔCleavage site(agagaaaaaga)→SpeI

agcaggaagcactatgggcgcagcgtcaatgacgctgacgggtacaggccagacaattattgtctgttatag  
tgcagcagcagaacaatttctgtgagggctattgaggcgcaacagcatctgttgcaactcacagtcctggggc  
atcaagcagctccaggcaagaatcctggctgtggaaagatacctaaggatcaacagctcctggggatttg  
gggttgctcttgaaaactcatttgcaccactgctgtgccttgggaatgctagttggagtaataaatctctgg  
aacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacacaagcttaatacac  
tccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggc  
aagtttgtggaattggttaacataacaaattggctgtggtatataaaattattcataatgatagtaggag  
gcttggtaggtttaagaatagtttttctgtactttctgtagtgaatagagtttaggcagggatattcacca  
ttatcgtttcagaccacctcccaatcccaggggacccgacaggcccgaaggaatagaagaagaaggtgg  
agagagagacagagacagatccattcgattagtgaaacggatccttagcacttatctgggacgatctgcgga  
gcctgtgcctcttcagctaccaccgcttgagagacttactcttgattgtaacgaggattgtggaacttctg  
ggacgcaggggggtgggaagccctcaaatattgggtggaatctcctacagtattggagtcaggagctaaagaa  
tagtgctgttagcttgctcaatgccacagctatagcagtagctgaggggacagatagggttatagaagtag  
tacaaggagcttatagagctattcgccacatacctagaagaataagacagggttggaaaggattttgcta  
taagatgggtggcaagtggtaaaaaagtagtgtggttggatggcctgctgtaagggaagaatgagacgag  
ctgagccagcagcagatgggttgggagcagcatctcgagacctagaaaaacatggagcaatcacagtagc  
aacacagcagctaacaatgctgattgtgctggctagaagcacaaaggaggaggaggtgggttttccagt  
cacacctcaggtacctttaagaccaatgacttacaaggcagctgtagatcttagccacttttttaaaagaaa  
aggggggactggaagggtcaattcactccaacgaagacaagatatccttgatctgtggatctaccacaca  
caaggctacttccctgattag

## FIGURE 46

### DNA Sequence of E<sup>m</sup>ΔCAT<sup>300</sup>.T (BH10) [SEQ ID NO: 23]:

Gaattctgcaacaactgctggttatccattttcagaattgggtgtcgacat

EcoRI

Agcagaataggcggttactcgacagaggagagcaagaaatggagccagtaga

Tat 1

tcctagactagagccctggaagcatccaggaagtcagcctaaaactgcttgtagccaattgctattgtaaaa  
agtgttgctttcattgccaaagtttgtttcataacaaaagccttaggcattctcctatggcaggaagaagcgg  
agacagcgacgaagacctcctcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagtaca  
tgtaatgcaacctatacaaatagcaatagtagcattagtagtagcaataataatagcaatagttgtgtggt  
ccatagtaatcatagaatataggaaaatattaagacaaaagaaaaatagacaggttaattgatagactaata  
gaaagagcagaagacagtggaatgagagtggaaggagaaatatcagcacttgtggagatgggggtggagat  
ggggcaccatgctccttgggatgttgatgtagtctgtagtgctacagaaaaattgtgggtcacagtctattat  
ggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgctaaagcatatgatacaga  
ggtacataatgtttgggccacacatgcctgtgtacccacagaccccaaccacaagaagtagtattggtaa  
atgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgaggatataatcagttta  
tgggatcaaagcctaaagccatgtgtaaaaattaaccccactctgtgttagtttaagtgcactgatttgaa  
gaatgataactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaaaactgctctt  
tcaatatcagcacaagcataagaggttaaggtgcagaaagaatatgcatttttttataaaacttgatataata  
ccaatagataatgatactaccagctatacgttgacaagttgtaacacctcagtcattacacaggcctgtcc  
aaaggtatcctttgagccaattcccatacattattgtgccccggtggttttgcgattctaaaatgtaata  
ataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatggaattaggcca  
gtagtatcaactcaactgctgttaaatggcagctctggcagaagaaggtagtaattagatctgccaat  
cacagacaatgctaaaaccataatagtagcagctgaaccaatctgtagaattaattgtacaagaccaaca  
acaatacaagaaaaagtatccgtatccagagaggaccaggagagcatttgttacaataggaaaaatagga  
aatatgagacaagcacattgtaacattagtagagcaaaatggaataacactttaaaacagatagatagcaa  
attaagagaacaatttggaaataataaaacaataatctttaagcagtcctcaggaggggacccagaaattg  
taacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaatagtacttgg  
tttaatagtacttggagtactaaagggtcaaataacactgaagggaagtgcacaatcacccctcccatgcag  
aataaaacaaattataaacatgtggcaggaagtaggaaaagcaatgtatgccctcccatcagtggaacaa  
ttagatgttcatcaaatattacagggtgctattaacaagagatggtggtaatagcaacaatgagtcagag  
atcttcagacctggaggaggagatatgagggacaattggagaagtgaattatataaatataaagtagtaaa  
aattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcagACTAGTgcagtggaatag  
gagctttgttccttgggttc

ΔCleavage site (agagaaaaaga) → SpeI

ttgggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacggtacaggccagacaattattgtc  
tggtatagtgcagcagcagaacaatttgcctgagggctattgaggcgcaacagcatctgttgcaactcacag  
tctggggcatcaagcagctccaggcaagaatcctggctgtggaaagatacctaaggatcaacagctcctg  
gggatttggggttgctctggaactcatttgcaccactgctgtgccttgggaatgctagttggagtaataa  
atctctggaacagatttggaaataacatgacctggatggagtggaagagagaaattaacaattacacaagct  
taatacactccttaattgaagaatcgaaaaccagcaagaaaagaatgaacaagaattattggaattagat  
aaatgggcaagtttgggaattggtttaacataacaaattggctgtggtatataaaattattcataatgat  
agtaggaggttggtaggtttaagaatagtttttgcctgtactttctgtagtgaatagagttaggcagggat  
attcaccattatcgtttcagaccacctcccaatcccgaggggacccgacaggcccgaggaatagaagaa  
gaaggtggagagagagacagagacagatccattcgattagtgaaacggatccttagcacttatctggttaa

**Figure 47**

**DNA Sequence of E<sup>m</sup>/E<sup>m</sup> (BH10) [SEQ ID NO: 24]:**

Gaattcgccaccatgggagtgaaaggagaaatatcagcacttgtggagatgg  
EcoRI Kozak NcoI  
gggtggagatggggcaccatgctccttgggatgttgatgatctgtagtgtctacagaaaaattgtgggtcac  
agtctattatggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgctaaagcat  
atgatacagaggtacataatgtttgggccacacatgcctgtgtacccacagaccccaaccacaagaagta  
gtattggtaaatgtgacagaaaaatTTAACATGTGGAAAAATGACATGGTAGAACAGATGCATGAGGATAT  
aatcagtttatgggatcaaagcctaaagccatgtgtataaattaaccccactctgtgttagtttaaagtga  
ctgatttgaagaatgataactaataccaatagtagtagcggggagaatgataatggagaaaggagagataaaa  
aactgctctttcaatatcagcacaaagcataagaggtgaaggtgcagaaagaatatgcattttttataaact  
tgatataataccaatagataatgatactaccagctatacgttgacaagttgtaacacctcagtcattacac  
aggcctgtccaaaggtatcctttgagccaattcccatatactattgtgccccggctggttttgcgattcta  
aaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgtacacatgg  
aattagggcagtagtatcaactcaactgctgttaaattggcagctctggcagaagaagaggtagtaattagat  
ctgccaatttcacagacaatgctaaaaccataatagtacagctgaaccaatctgtagaaattaattgtaca  
agacccaacaacaatacaagaaaaagtatccgtatccagagaggaccaggggagagcatttgttacaatagg  
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tagatagcaaatgaagaacaatttggaaataataaaaacaataatctttaagcagtcctcaggaggggac  
ccagaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaa  
tagtacttggtttaatatgtacttggagtactaaagggtcaaataacactgaaggaagtgcacaaatcccc  
tcccatgcagaataaaacaaattataaacatgtggcaggaagttaggaaaagcaatgtatgccctcccac  
agtggacaaattagatgttcatcaaataattacagggtgctattaacaagagatgggtggaatagcaacaa  
tgagtccgagatcttcagacctggaggaggagatatgagggacaattggagaagtgaattatataaatata  
aagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagagtggtgcagagagaaaaa  
agagcagtggggaataggagcttgttccttgggttcttgggagcagcaggaagcaactatgggcgcagcgtc  
aatgacgctgacggtagcaggccagacaattattgtctggtatagtgcagcagcagaacaatttgcagggg  
ctattgagggcgaacagcatctgttgcaactcacagtctggggcatcaagcagctccaggcaagaatcctg  
gctgtggaaagatacctaaaggatcaacagctcctggggatttgggggttgcctctggaaaactcatttgcac  
cactgctgtgccttggaatgctagttggagtaataaatctctggaacagatttgggaataacatgacctgga  
tggagtgggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgcaaaaccag  
caagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaattggtttaacataac  
aaattggctgtggtatataaaaattattcataatgtagtaggaggttggtaggtttaagaatagtttttg  
ctgtactttctgtagtgaatagagtttaggcagggtatcaccattatcgtttcagacccacctcccaatc  
ccgaggggacccgacaggcccgaaggaatagaagaagaaggtggagagagagacagagacagatccattcg  
attagtgaacggatccttagcacttatctgggacgatctgcggagcctgtgcctcttcagctaccaccgct  
tgagagacttactcttgattgtaacgaggattgtggaacttctgggacgcagggggtgggaagccctcaaa  
tattgggtggaatctcctacagtattggagtcaggagctaaagaatagtgtctgttagcttgcctcaatgccac  
agctatagcagtagctgaggggacagatagggttatagaagtagtacaaggagcttatagagctattcgcc  
acatacctagaagaataagacagggttggaaggattttgctataa

**FIGURE 48**

**Sequences of V3 loop Multi-clade HIV-1 Clones:**

Clade	ACC#	HIV-1 Strain	From(nt)	To(nt)
B	M15654	BH10	885	992
A	U09127	192UG037WHO.01083hED	888	992
C	U09126	192BR025WHO.01093hED	876	980
D	U43386	192UG024.2	888	989
E	U08458	193TH976.17	894	998
F	U27401	193BR020.17	888	992
G	U30312	192RU131.9	885	989

Tgtacaagacccaacaacaataacaagaaaaagtatccgtatccagagagga  
ccaggagagagcatttggttacaataggaaaaataggaaatatgagacaagca  
cattgt **Clade B [SEQ ID NO: 25]**

Tgtaccagacctaacaacaataacaagaaaaagtgtacgtataggaccagga  
caaacatttctatgcaacagggtgatataataggggatataagacaagcacat  
tgt **Clade A [SEQ ID NO: 26]**

Tgtacgagacccaacaataataacaagaaaaagtataaggataggaccagga  
caagcatttctatgcaacaggagaaataataggagatataagacaagcacat  
tgt **Clade C [SEQ ID NO: 27]**

Tgcacaaggccctacaacaataataagacaaaaggacccccataggactaggg  
caagcactctataacaagaagaatagaagatataagaagagcacattgt  
**Clade D [SEQ ID NO: 28]**

Tgtaccagaccctccaccaataacaagaacaagtatacgtataggaccagga  
caagtatttctatagaacaggagacataacaggagatataagaaaagcatat  
tgt **Clade E [SEQ ID NO: 29]**

Tgtacaagacccaacaacaataacaagaaaaagaatatcttttaggaccagga  
cgagtattttatacagcaggagaaataataggagacatcagaaaggcacat  
tgt **Clade F [SEQ ID NO: 30]**

Tgtaccagacctaataacaataacaagaaaaagtataacttttgcaccagga  
caagcgctctatgcaacagggtgaaataataggagatataagacaagcacat  
tgt **Clade G [SEQ ID NO: 31]**

## FIGURE 49A

DNA sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 32]:

Atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatggggcaccatgctccttgggat  
gttgatgatctgtagtgtacagaaaaattgtgggtcacagtctattatggggtacctgtgtggaaggaag  
caaccaccactctatTTTTgtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccaca  
catgctgtgtacccacagaccccaaccacaagaagtagtatttgtaaattgtacagaaaaattttaacat  
gtggaaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaagcctaaagccat  
gtgtaaaattaacccactctgtgtt**ggagctgg**tagttgtaacacctcagt

V1, V2 deletion, GAG insertion

Cattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccggctgggtttg  
cgattctaaaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtcagcacagtacaatgt  
acacatggaattaggccagtagtatcaactcaactgctgttaaattggcagtctggcagaagaagaggtagt  
aattagatctgccaatttcacagacaatgctaaaaccataatgtacagctgaaccaatctgtagaaatta  
att**gt**tacaagaccaacaaca

Start of Clade B

Tacaagaaaaagtatccgtatccagagaggaccagggagagcatttgttacaataggaaaaataggaaata  
tgagacaagcacattgt**ctcgggtgt**taccag

Insert a **AvaI** site Clade A

Acctaacaacaatacaagaaaaagtgtacgtataggaccaggacaacattctatgcaacaggtgatataa  
taggggatataagacaagcacattgt**gt**tac

Clade C

Gagaccaacaataatacaagaaaaagtataaggataggaccaggacaagcattctatgcaacaggagaaa  
taataggagatataagacaagcacattgt**tg**

Clade D

Cacaaggccctacaacaataataagacaaaggacccccataggactagggaagcactctatacaacaagaa  
gaatagaagatataagaagagcacattgt**tg**

Clade E

Taccagaccctccaccaatacaagaacaagtatacgtataggaccaggacaagtattctatagaacaggag  
acataacaggagatataagaaaaagcatattgt**ggatcctgt**tacaagaccaacaacaatacaagaaaaaga  
atatctttagg

BamHI clade F

Accaggacgagtattttatacagcaggagaaataataggagacatcagaaaggcacattgt**gt**taccagac  
ctaataacaatacaagaaaaagtataacttt

Clade G

Tgcaccaggacaagcgctctatgcaacaggtgaaataataggagatataagacaagcacattgt**ctcggga**  
acattagtagagcaaaatggaataacacttt

Insert a **AvaI**

Aaaacagatagatagcaaattaagagaacaatttggaaataataaaacaataatctttaagcagtcctcag  
gaggggacccagaaaattgtaacgcacagttttaattgtggaggggaatttttctactgtaattcaacaaa  
ctgtttaatagtacttggtttaatagtacttggagtactaaaggggtcaaataacactgaaggaagtgcac  
aatcaccctcccatgcagaataaaacaaattataaacatgtggcaggaagttaggaaaagcaatgtatgcc  
ctcccatcagtggaacaaattagatgttcacaaatattacagggctgctattaacaagagatgggtggaat  
agcaacaatgagtcagatcttcagacctggaggagagatagagggacaattggagaagtgaattata  
taaataaaagtagtaaaaattgaaccattaggagtgcacccaccaaggcaagagaagagtgggtgcaga  
**ctagtgcagtg**gg

Cleavage site mutation (**SpeI**)

Aataggagctttgttccttgggttcttgggagcagcaggaagcactatgggagcagcgtcaatgacgctga  
cggtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgcagggctattgagggc  
caacagcatctgttgcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaag  
atacctaaaggatcaacagctcctggggatttgggggtgctctggaactcatttgcaccactgctgtgc  
cttgggaatgctagttggagtaataatctctggaacagatttgggaataacatgacctggatggagtgggac  
agagaaattaacaattacacaagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaa  
tgaacaagaattattgggaattagataaatgggcaagtttgggaattggtttaacataacaattggctgt  
ggatatataaaat**ctgtgctgctgctgctcctgctcctcctcctccaggccacggatttcatgtcc**  
**ctgtga** GPI anchor

**FIGURE 49B**

**Amino acid sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 33]:**

M T T A A E I V S K V G A P F T F R Y P T T G N A N G A G V L T M R N R P L T N G Q V M S E W A  
R M V S C N S G F C Q S K N V R Y P A Y T N D N G N E K N T F E W C N S T F L L I Q P T L L Y T  
V L Y D V F L A E N C L T N T P A N T N R T I N E T I W N H N G Q S E E K L T L K L W W I D I D  
K L Y A P N W G P N T A I N I N T N G N R R T I R I N K S S E S L A G V R Q L N M E K K F  
E G G K T M D S I K H E I T G N G N E I I T G R I K G N T F D V N E Y K F Q A L G A E E W S M  
K M V A D W Q C P T G E V R K N D T I R E S D K G S D T I N W T G I I K R L A I Q I S W S A W S  
Y L P Y P K S N I F I E Q K I T I R I Q D I I R D I I L I C F I K T F Y R G R E A W W D Q S L L  
Q M V D N N L T H N R V L S G R I K G R I R R I I T R K F G N T A G R K V A Q A R G S R N L L \*  
H I W T P D K S Y G P V N I N K G S D T R I K S R F Q Q K G S L M L P V V A L Q I C N E Q W L  
L C K E Q M P V C T V I Q R M S D I I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N L  
W S E V E V C I A G V R S I R V I R R I A P Y G A P H D S F W C A L G K T S S H A G S N E W L  
R A A H V E V T P P S S V Q R R I Q G H G C P H G C S S F S R P T G I S T G L V K L N K F L  
W T N V Q K Q A C T A E R A I Q G A L C Q G C Q L K G Y T I P R D E A M I L E L E Y N N S  
G E T V L M L A G T Q N I G H G A P H G C V S R C A G L G C K I D M P V G V Q R I Q T E I L  
W K T W V H T C F N L F N P C P H G C Q T F C V T L N R D N G Q S G R L G A Q L Y C I S Q T S  
R L L A N E P P A V L T C G L G C Q C A R Y T F R Y I E P S S I G G D G I A Q Q T L T W L E N L  
W F T V D L K I S L D T R G Q C A T L P R R Y P A S Q E T N I Q N N V G S Q V K T N I L W L  
G V C H T I C V L T N N R A C T F R Y S T P T N T R F I Q N N I S W A A M N W D A N H L L Q

## FIGURE 50A

### 1. DNA sequence of p17/24 in natural form [SEQ ID NO: 34]:

atgggtgagagagcggtcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagg  
gggaaagaaaaaatataaattaaaacatatagtagtggaagcagggagctagaacgattcgagtttaac  
ctggcctgttagaaacatcagaaggctgtagacaaatactgggacagctacaaccatcccttcagacagga  
tcagaagaacttagatcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaa  
agacaccaaggaagcttttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagcag  
cagctgacacaggacacagcagtcaggtcagccaaaattaccctatagtgagaacatccaggggcaaagt  
gtacatcaggccatataccttagaacttttaaatgcatgggtaaaagtagtagaagagaaggctttcagccc  
agaagtaatacccatgttttcagcattatcagaaggagccaccccacaagattttaaacaccatgctaaca  
cagtggggggacatcaagcagccatgcaaagttaaagagacatcaatgaggaagctgcagaatgggat  
agagtacatccagtgcagggcctattgcaccaggccagatgagagaaccaaggggaagtgcataagc  
aggaactactagtacccttcaggaacaaataggatggatgacaaataatccacctatccagtaggagaaa  
tttataaaagatggataatcctgggattaaataaaaatagtaagaatgtatagccctaccagcattctggac  
ataagacaaggacccaaaagaaccttttagagactatgtagaccggttctataaaactctaagagccgagca  
agcttcacaggaggttaaaaaattggatgacagaaaccttgttgggtccaaaatgcgaaccagattgtaaga  
ctatttttaaagcattgggaccagcggtacactagaagaatgatgacagcatgtcagggagtaggagga  
cccggccataaggcaagagttttgttaa

### 2. DNA sequence of p17/24 in secreted form [SEQ ID NO: 35]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg  
gp120 signal peptide  
ggcaccatgctccttgggatgttgatgatctgtagtgtggtgagagagcg  
p17/p24

tcagtattaagcgggggagaattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaata  
taaattaaaacatatagtagtggaagcagggagctagaacgattcgagtttaacctggcctgttagaaa  
catcagaaggctgtagacaaatactgggacagctacaaccatcccttcagacaggatcagaagaacttaga  
tcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagc  
tttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacaggac  
acagcagtcaggtcagccaaaattaccctatagtgagaacatccaggggcaaagtgtacatcaggccata  
tcacctagaacttttaaatgcatgggtaaaagtagtagaagagaaggctttcagcccagaagtaatacccat  
gttttcagcattatcagaaggagccaccccacaagattttaaacaccatgctaacaacagtggggggacatc  
aagcagccatgcaaagttaaagagacatcaatgaggaagctgcagaatgggatagagtacatccagtgc  
catgagggcctattgcaccaggccagatgagagaaccaaggggaagtgcatagcaggaactactagtac  
ccttcaggaacaaataggatggatgacaaataatccacctatccagtaggagaaatttataaaagatgga  
taatcctgggattaaataaaaatagtaagaatgtatagccctaccagcattctggacataagacaaggacca  
aaagaaccttttagagactatgtagaccggttctataaaaactctaagagccgagcaagcttcacaggaggt  
aaaaaattggatgacagaaaccttgttgggtccaaaatgcgaaccagattgtaagactatttttaaagcat  
tggaaccagcggtacactagaagaatgatgacagcatgtcagggagtaggaggacccggccataaggca  
agagttttgttaa



**FIGURE 50B**

**1. Amino acid sequence of p17/24 in natural form [SEQ ID NO: 37]:**

M	G	A	R	A	S	V	L	S	G	G	E	L	D	R	W	E	K
I	R	L	R	P	G	G	K	K	K	Y	K	L	K	H	I	V	W
A	S	R	E	L	E	R	F	A	V	N	P	G	L	L	E	T	S
E	G	C	R	Q	I	L	G	Q	L	Q	P	S	L	Q	T	G	S
E	E	L	R	S	L	Y	N	T	V	A	T	L	Y	C	V	H	Q
R	I	E	I	K	D	T	K	E	A	L	D	K	I	E	E	S	Q
N	K	S	K	K	K	A	Q	Q	A	A	A	D	T	G	H	S	S
Q	V	S	Q	N	Y	P	I	V	Q	N	I	Q	G	Q	M	V	H
Q	A	I	S	P	R	T	L	N	A	W	V	K	V	E	E	A	K
A	F	S	P	E	V	I	P	N	F	S	A	L	S	G	A	A	T
P	Q	D	L	K	N	T	M	N	T	V	G	G	H	Q	R	V	M
Q	V	H	A	G	P	I	A	P	G	Q	M	R	E	P	R	G	S
D	I	A	G	T	T	S	T	L	Q	E	Q	I	G	W	M	T	N
N	P	P	I	P	V	G	E	I	Y	K	R	W	I	I	L	G	L
N	K	I	V	R	M	Y	S	P	T	S	I	L	D	I	R	Q	G
P	K	E	P	F	R	D	Y	V	D	R	F	Y	K	T	L	R	A
E	Q	A	S	Q	E	V	K	N	W	M	T	E	T	L	L	V	Q
N	A	N	P	D	C	K	T	I	L	K	A	L	G	P	A	A	T
L	E	E	M	M	T	A	C	Q	G	V	G	G	P	G	H	K	A
R	V	L	*														

**2. Amino acid sequence of p17/24 in secreted form [SEQ ID NO: 38]:**

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	P	G	G
K	K	K	Y	K	L	K	H	I	V	W	A	S	R	E	L	E	R
F	A	V	N	P	G	L	L	E	T	S	E	G	C	R	Q	I	L
G	Q	L	Q	P	S	L	Q	T	G	S	E	E	L	R	S	L	Y
N	T	V	A	T	L	Y	C	V	H	Q	R	I	E	I	K	D	T
K	E	A	L	D	K	I	E	E	E	Q	N	K	S	K	K	K	A
Q	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	P
Q	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	P
I	V	Q	N	I	Q	G	Q	M	V	H	Q	A	I	S	P	R	T
L	N	A	W	V	K	V	V	E	E	K	A	F	S	P	E	V	I
P	M	F	S	A	L	S	E	G	A	T	P	Q	D	L	N	T	M
L	N	T	V	G	G	H	Q	A	A	M	Q	M	L	K	E	T	I
N	E	E	A	A	E	W	D	R	V	H	P	V	H	A	G	P	I
A	P	G	Q	M	R	E	P	R	G	S	D	I	A	G	T	T	S
T	L	Q	E	Q	I	G	W	M	T	N	N	P	P	I	P	V	G
E	I	Y	K	R	W	I	I	I	R	Q	G	P	K	E	P	R	Y
S	P	T	S	I	L	D	I	R	L	A	E	Q	E	A	S	M	D
Y	V	D	R	F	Y	K	T	L	R	A	T	L	E	E	Q	E	V
T	I	L	K	A	G	P	G	H	K	A	R	V	L	*			
C	Q	G	V	G	G	P	G										



## FIGURE 51A

### 1. DNA sequence of p17 in natural form [SEQ ID NO: 40]:

atgggtgcgagagcggtcagttattaagcgggggagaattagatcgatgggaaaaaattcg  
gttaaggccagggggaaagaaaaaatataaattaaaacatatagtatgggcaagcagg  
agctagaacgattcgcagttaatcctggcctgttagaaacatcagaaggctgtagacaa  
atactgggacagctacaacctccttcagacaggatcagaagaacttagatcattata  
taatacagtagcaacctctattgtgtgcatcaaaggatagagataaaagacaccaagg  
aagcttttagacaagatagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagca  
gcagctgacacaggacacagcagtcagggtcagccaaaattactaa

### 2. DNA sequence of p17 in secreted form [SEQ ID NO: 41]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg  
gp120 signal peptide  
ggcaccatgctccttgggatgttgatgatctgtagtgtc**ggt**gcgagagcg  
p17  
tcagtattaagcgggggagaattagatcgatgggaaaaaattcgggttaaggccaggggg  
aaagaaaaaatataaattaaaacatatagtatgggcaagcaggagctagaacgattcg  
cagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagcta  
caacctcccttcagacaggatcagaagaacttagatcattatataatacagtagcaac  
cctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagcttttagacaaga  
tagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagga  
cacagcagtcagggtcagccaaaattactaa

### 3. DNA sequence of p17 in membrane bound form [SEQ ID NO: 42]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg  
gp120 signal peptide  
ggcaccatgctccttgggatgttgatgatctgtagtgtc**ggt**gcgagagcg  
p17  
tcagtattaagcgggggagaattagatcgatgggaaaaaattcgggttaaggccaggggg  
aaagaaaaaatataaattaaaacatatagtatgggcaagcaggagctagaacgattcg  
cagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagcta  
caacctcccttcagacaggatcagaagaacttagatcattatataatacagtagcaac  
cctctattgtgtgcatcaaaggatagagataaaagacaccaaggaagcttttagacaaga  
tagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagga  
cacagcagtcagggtcagccaaaattac  
ttattcataatgatagtaggaggcttggttaggtttaagaatagtttttgctgtactttc  
tgtagtgaatagagtttaggcagggatattcaccattatcgtttcagacccacctcccaa  
tcccaggggataa  
gp41 transmembrane domain

FIGURE 51B

**1. Amino acid sequence of p17 in natural form [SEQ ID NO: 43]:**

M	G	A	R	A	S	V	L	S	G	G	E	L	D	R	W	E	K
I	R	L	R	P	G	G	K	K	K	Y	K	L	K	H	I	V	W
A	S	R	E	L	E	R	F	A	V	N	P	G	L	L	E	T	S
E	G	C	R	Q	I	L	G	Q	L	Q	P	S	L	Q	T	G	S
E	E	L	R	S	L	Y	N	T	V	A	T	L	Y	C	V	H	Q
R	I	E	I	K	D	T	K	E	A	L	D	K	I	E	E	E	Q
N	K	S	K	K	K	A	Q	Q	A	A	A	D	T	G	H	S	S
Q	V	S	Q	N	Y	*											

**2. Amino acid sequence of p17 in secreted form [SEQ ID NO: 44]:**

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	P	G	G
K	K	K	Y	K	L	K	H	I	V	W	A	S	R	E	L	E	R
F	A	V	N	P	G	L	L	E	T	S	E	G	C	R	Q	I	L
G	Q	L	Q	P	S	L	Q	T	G	S	E	E	L	R	S	L	Y
G	Q	L	Q	P	S	L	Q	T	G	S	E	E	L	R	S	L	Y
N	T	V	A	T	L	Y	C	V	H	Q	R	I	E	I	K	D	T
K	E	A	L	D	K	I	E	E	E	Q	N	K	S	K	K	K	A
Q	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	*

**3. Amino acid sequence of p17 in membrane bound form [SEQ ID NO: 45]:**

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	G	A	R	A	S	V
L	S	G	G	E	L	D	R	W	E	K	I	R	L	R	P	G	G
K	K	K	Y	K	L	K	H	I	V	W	A	S	R	E	L	E	R
G	Q	L	Q	P	S	L	Q	T	G	S	E	E	L	R	S	L	Y
N	T	V	A	T	L	Y	C	V	H	Q	R	I	E	I	K	D	T
K	E	A	L	D	K	I	E	E	E	Q	N	K	S	K	K	K	A
Q	Q	A	A	A	D	T	G	H	S	S	Q	V	S	Q	N	Y	L
F	I	M	I	V	G	R	L	V	G	L	R	I	V	F	A	V	L
S	V	V	N	R	V	R	Q	G	Y	S	P	L	S	F	Q	T	H
L	P	I	P	R	G	*											

**FIGURE 52B**

**1. Amino acid sequence of p24 in natural form [SEQ ID NO: 49]:**

M	P	I	V	Q	N	I	Q	G	Q	M	V	H	Q	A	I	S	P	P
R	T	L	N	A	W	V	K	V	V	E	E	K	A	F	S	P	L	E
V	I	P	M	F	S	G	L	S	E	G	A	T	P	Q	D	L	K	N
T	M	L	N	T	V	A	G	H	Q	A	A	M	Q	M	L	H	A	E
T	I	N	E	E	A	A	E	W	D	R	V	H	P	V	A	G	T	P
P	I	A	P	G	Q	M	R	E	P	R	G	S	D	I	A	I	P	R
T	S	T	L	Q	E	Q	I	G	W	M	T	N	N	P	P	I	V	F
V	G	E	I	Y	K	R	W	I	I	L	G	L	N	K	E	P	S	Q
M	Y	S	P	T	S	I	L	D	I	R	Q	G	P	K	A	S	P	D
R	D	Y	V	D	R	F	Y	K	T	L	R	A	E	Q	A	P	Q	M
E	V	K	N	W	M	T	E	T	L	L	V	Q	N	A	N	P	D	M
C	K	T	I	L	K	A	L	G	P	A	A	T	L	E	E	*		
T	A	C	Q	G	V	G	G	P	G	H	K	A	R	V	L			

**2. Amino acid sequence of p24 in secreted form [SEQ ID NO: 50]:**

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	P	I	V	Q	N	I
Q	G	Q	M	V	H	Q	A	I	S	P	R	T	L	N	A	W	V
K	V	V	E	E	K	A	F	S	P	E	V	I	P	M	F	S	A
L	S	E	G	A	T	P	Q	D	L	N	T	M	L	N	T	V	G
G	H	Q	A	A	M	Q	M	L	K	E	T	I	N	E	E	A	A
E	W	D	R	V	H	P	V	H	A	G	P	I	A	P	Q	Q	M
R	E	P	R	G	S	D	I	A	G	T	T	S	T	L	Y	E	Q
I	G	W	M	T	N	N	P	P	I	P	V	G	E	I	K	R	I
W	I	I	L	G	L	N	K	I	V	R	M	Y	S	P	S	F	T
L	D	I	R	Q	G	P	K	E	P	F	R	D	Y	V	D	R	A
Y	K	T	L	R	A	E	Q	A	S	Q	E	V	K	N	W	M	T
E	T	L	L	V	Q	N	A	N	P	D	C	K	T	I	L	K	A
L	G	P	A	A	T	L	E	E	M	M	T	A	C	Q	G	V	G
G	P	G	H	K	A	R	V	L	*								

**3. Amino acid sequence of p24 in secreted form [SEQ ID NO: 51]:**

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	P	I	V	Q	N	I
Q	G	Q	M	V	H	Q	A	I	S	P	R	T	L	N	A	W	V
K	V	V	E	E	K	A	F	S	P	E	V	I	P	M	F	S	A
L	S	E	G	A	T	P	Q	D	L	N	T	M	L	N	T	V	G
G	H	Q	A	A	M	Q	M	L	K	E	T	I	N	E	E	A	A
R	E	P	R	G	S	D	I	A	G	T	T	S	T	L	Y	Q	M
I	G	W	M	T	N	N	P	P	I	P	V	G	E	I	K	R	I
W	I	I	L	G	L	N	K	I	V	R	M	Y	S	P	D	S	F
L	D	I	R	Q	G	P	K	E	P	F	R	D	Y	V	T	M	T
Y	K	T	L	R	A	E	Q	A	S	Q	E	V	K	N	W	K	A
E	T	L	L	V	Q	N	A	N	P	D	C	A	T	I	L	V	G
L	G	P	A	A	T	L	E	E	M	M	T	M	C	Q	G	G	L
G	P	G	H	K	A	R	V	L	L	F	I	V	I	V	G	R	Q
V	G	L	R	I	V	F	A	V	L	S	P	I	N	R		*	
G	Y	S	P	L	S	F	Q	T	H	L			P				

## FIGURE 53A

DNA sequence of modified Env including multi-clade V3 loops and Tat  
[SEQ ID NO: 52]:

Gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacatagcagaataggcgt  
tactcgacagaggagagcaagaaatggagccagtagatcctagactagagccc

### Tat1

Tggaagcatccaggaagtcagcctaaaactgcttgtagcaattgctattgtaaaaagtgttgctt  
tcattgccaagtttgtttcatacaaaaagccttaggcattctcctatggcaggaagaagcggagac  
agcgacgaagacctcctcaaggcagtcagactcatcaagtttctctatcaaagcagtaagtagta  
catgtaatgcaacctatacaaatagcaatagtagcattagtagtagcaataataatagcaatagt  
tgtgtggtccatagtaatcatagaatataggaaaatattaagacaaaagaaaaatagacaggttaa  
ttgatagactaatagaaagagcagaagacagtgggcaatggagagtgaaggagaaatatcagcactt  
gtggagatgggggtggagatggg

### Envelope

Gcaccatgctccttgggatgttgatgatctgtagtgtacagaaaaattgtgggtcacagtctat  
tatggggtagctgtgtggaaggaagcaaccaccactctattttgtgcatcagatgctaaagcata  
tgatacagaggtacataatgtttgggccacacatgcctgtgtacccacagaccccaaccacaag  
aagtagtatttggtaaatgtgacagaaaaattttaacatgtggaaaaatgacatggtagaacagatg  
catgaggatataatcagtttatgggatcaaagcctaaagccatgtgtaaaattaaccccactctg  
tgttggagctggtagttgtaacacctca

Delete V1V2, insert Gly,Ala,Gly

gtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtgccccggc  
tggttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccatgtacaaatgtca  
gcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgctgttaaattggcagt  
ctggcagaagaagaggtagtaattagatctgccaatttcacagacaatgctaaaaccataatagt  
acagctgaaccaatctgtagaattaattgtacaag

### First multi-clade repeat

Acccaacaacaatatacaagaaaaagtatccgtatccagagaggaccagggagagcatttgttaca  
taggaaaaataggaaatatgagacaagcacattgtctcggtgtaccagacctaaacaacaatata  
agaaaaagtgtacgtataggaccaggacaaacattctatgcaacaggtgatataataggggatat  
aagacaagcacattgttgtacgagaccaacaataatacaagaaaaagtataaggataggaccag  
gacaagcattctatgcaacaggagaaataataggagatataagacaagcacattgttgcacaagg  
ccctacaacaatataagacaaaggacccccataggactagggaagcactctatacaacaagaag  
aatagaagatataagaagagcacattgttgtaccagacctccaccaataacaagaacaagtatac  
gtataggaccaggacaagtattctatagaacaggagacataacaggagatataagaaaagcatat  
tgtggatcctgtacaagacccaacaacaatacaagaaaaagaatatctttaggaccaggacgagt  
attttatacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagacctata  
acaatacaagaaaaagtataacttttgcaccaggacaagcgctctatgcaacaggtgaaataata  
ggagatataagacaagcacattgtctcggtgtaccagacctaaacaacaata

### Second multi-clade repeat

Caagaaaaagtgtacgtataggaccaggacaaacattctatgcaacaggtgatataataggggat  
ataagacaagcacattgttgtacgagaccaacaataatacaagaaaaagtataaggataggacc  
aggacaagcattctatgcaacaggagaaataataggagatataagacaagcacattgttgcaca  
ggccctacaacaatataagacaaaggacccccataggactagggaagcactctatacaacaaga  
agaatagaagatataagaagagcacattgttgtaccagacctccaccaataacaagaacaagtat  
acgtataggaccaggacaagtattctatagaacaggagacataacaggagatataagaaaagcat  
attgtggatcctgtacaagacccaacaacaatacaagaaaaagaatatctttaggaccaggacga  
gtattttatacagcaggagaaataataggagacatcagaaaggcacattgttgtaccagacctaa  
taacaatacaagaaaaagtataacttttgcaccaggacaagcgctctatgcaacaggtgaaataa





## FIGURE 54A

DNA sequence of modified Env including multi-clade V3 loops, Tat and Rev  
[SEQ ID NO: 54]:

gaattctgcaacaactgctgtttatccattttcagaattgggtgtcgacatagcagaat  
aggcgttactcgacagaggagagcaagaa**atgg**agccagtagatcctagactagagccc

Tat1

tggaagcatccaggaagtcagcctaaaactgcttgtagccaattgctattgtaaaaagtg  
ttgctttcattgccaagtttgtttcataacaaaagccttaggcattctcct**atgg**cagga

Rev1

agaagcggagacagcgcgaagacctcctcaaggcagtcagactcatcaagtttctcta  
tcaaagcagtaagtagtacatgtaatgcaacctatacaaatagcaatagtagcattagt  
agtagcaataataatagcaatagttgtgtggtccatagtaatcatagaatataggaaaa  
tattaagacaaaagaaaaatagacagggttaattgatagactaatagaaagagcagaagac  
agtggca**atgg**agagtgaaggagaaatatcagcacttgtggagatgggggtggagatggg

Envelope

Gcaccatgctccttgggatgttgatgatctgtagtgctacagaaaaattgtgggtcaca  
gtctattatgggggtacctgtgtggaaggaagcaaccaccactctattttgtgcatcaga  
tgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctgtgtacca  
cagaccccaaccacagaagtagtattggtaaatgtgacagaaaattttaacatgtgg  
aaaaatgacatggtagaacagatgcatgaggatataatcagtttatgggatcaaagcct  
aaagccatgtgtaaaattaacccactctgtgtt**ggagctgg**tagttgtaacacctca

Delete V1V2, insert Gly,ala,gly

gtcattacacaggcctgtccaaaggtatcctttgagccaattcccatacattattgtgc  
cccggctgggttttgcgattctaaaatgtaataataagacggtcaatggaacaggaccat  
gtacaaatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaa  
ctgctgtttaaattggcagctctggcagaagaagaggtagtaattagatctgccaatctc  
agacaatgctaaaaccataatagtagcagctgaaccaatctgtagaattaat**tg**tacaa  
g

First multi-clades repeat

Acccaacaacaatacaagaaaaagtatccgtatccagagaggaccagggagagcatttg  
ttacaataggaaaaataggaaatatgagacaagcacattgtctcgggtgtaccagacct  
aacaacaatacaagaaaaagtgtagctataggaccaggacaaacattctatgcaacagg  
tgatataataggggatataagacaagcacattgttgtagcagacccaacaataatacaa  
gaaaaagtataaggataggaccaggacaagcattctatgcaacaggagaaataatagga  
gatataagacaagcacattgttgacaaaggccctacaacaataataagacaaaggacccc  
cataggactaggggcaagcactctatacaacaagaagaatagaagatataagaagagcac  
attgttgtagcagaccctccaccaatacaagaacaagtatacgtataggaccaggacaa  
gtattctatagaacaggagacataacaggagatataagaaaagcatattgtggatcctg  
tacaagaccaacaacaatacaagaaaaagaatatctttaggaccaggacgagtatttt  
atacagcaggagaaataataggagacatcagaaaggcacattgttgtagcagaccta  
aacaatacaagaaaaaggtataacttttgaccaggacaagcgctctatgcaacagggtga  
aataataggagatataagacaagcacattgtt**cctcgggtgt**accagacctaacaacaata

Second multi-clade repeat

caagaaaaagtgtagctataggaccaggacaaacattctatgcaacagggtgatataata  
ggggatataagacaagcacattgttgtagcagacccaacaataatacaagaaaaagtat

## FIGURE 54A-continued

aaggataggaccaggacaagcattctatgcaacaggagaaataataggagatatagac  
aagcacattgttgcacaaggccctacaacaatatagacaaaggacccccataggacta  
gggcaagcactctatacaacaagaagaatagaagatatagaagagcacattgttgta  
cagaccctccaccaataacaagaacaagtatacgtataggaccaggacaagtattctata  
gaacaggagacataacaggagatatagaaaagcatattgtggatcctgtacaagacc  
aacaacaatacaagaaaaagaatatctttaggaccaggacgagtattttatacagcagg  
agaaataataggagacatcagaaaggcacattgttgtaccagacctaataacaataca  
gaaaaagtataacttttgcaccaggacaagcgctctatgcaacagggtgaaataatagga  
gatataagacaagcacattgtctcgggaacattagtagagcaaatggaataacacttt

AvaI site, end of two multi-clade repeat

Aaaacagatagatagcaaattaagagaacaatttggaaataataaaacaataatcttta  
agcagtcctcaggaggggacccagaaattgtaacgcacagttttaattgtggaggggaa  
tttttctactgtaattcaacacaactgtttaatagtacttggtttaatagtacttggag  
tactaaaggggtcaaataacactgaaggaagtgcacaatcacctcccatgcagaataa  
aacaattataaacatgttggcaggaagtaggaaaagcaatgtatgccctcccatcagt  
ggacaaattagatgttcatcaaataattacagggctgctattaacaagagatgggtggtaa  
tagcaacaatgagtcagagatcttcagacctggaggaggagatatgagggacaattgga  
gaagtgaattatataaatataaagtagtaaaaattgaaccattaggagtagcaccacc  
aaggcaaagagaagagtgggtgcagactagtgagtggaataggagccttggctccttg

Delete the cleavage site, insert SpeI

gttcttgggagcagcaggaagcactatgggctgcacgtcaatgacgctgacggtacagg  
ccagacaattattgtctgatatagtgcagcagcagaacaatttgcagggctattgag  
gcgcaacagcatctgttgcaactcacagctctggggcatcaaacagctccaggcaagaat  
cctggctgtggaaagatacctaaggaatcaacagctcctggggatttgggggtgctctg  
gaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatctctg  
gaacagatttggaaataacatgacctggatggagtgggacagagaaattaacaattacac  
aagcttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaag  
aattattggaattagataaatgggcaagtttgtggaattgggttaacataacaattgg  
ctgtggtatataaaaattattcataatgatagtaggaggcttggtaggtttaagaatagt  
ttttgctgtactttctatagtgaatagagtttaggcagggatattcaccattatcgtttc  
agaccacctccaatcccagggggacccgacaggcccgaaggaatagaagaagaaggt  
ggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctg  
ggacgatctgcggagcctgtgcctcttcagctaccaccgcttgagagacttactcttga  
ttgtaacgaggattgtggaacttctgggacgcaggggggtgggaagccctcaaatattgg  
tggaatctcctacagtattggagtcaggaactaaagaatagtgctgttaacttgcctcaa  
tgccacagccatagcagtagctgagtaa

gp41, but 99 bp truncation at C-terminal

**FIGURE 54B**

**Amino acid sequence of modified Env including multi-clade V3 loops, Tat and Rev**  
**[SEQ ID NO: 55]:**

M	R	V	K	E	K	Y	Q	H	L	W	R	W	G	W	R	W	G
T	M	L	L	G	M	L	M	I	C	S	A	T	E	K	L	W	V
T	V	D	Y	G	V	P	V	W	K	E	H	T	T	W	L	F	C
A	S	Y	A	K	A	Y	D	T	E	V	A	N	V	V	A	T	H
A	C	V	P	T	D	P	N	P	Q	E	V	V	L	V	N	V	T
E	N	F	N	M	W	K	N	D	M	V	E	Q	M	H	E	D	I
I	S	L	W	D	Q	S	L	K	P	C	V	K	L	T	P	L	C
V	G	A	G	S	C	N	T	S	V	I	T	Q	A	C	P	K	V
S	F	E	P	I	P	I	H	Y	C	A	P	A	G	F	A	I	L
K	C	N	N	K	T	F	N	G	T	V	S	C	T	N	V	S	T
V	Q	C	T	H	G	I	R	P	V	V	S	T	Q	L	L	L	N
G	S	L	A	E	E	E	V	V	I	R	S	A	N	F	T	D	N
A	K	T	I	I	V	Q	L	N	Q	S	V	E	I	N	C	T	R
P	N	N	N	T	R	K	S	I	R	I	Q	R	G	P	G	R	A
F	V	T	I	G	K	I	G	N	M	R	Q	A	H	C	L	G	C
T	R	P	N	N	N	T	R	K	S	V	R	I	G	P	G	Q	T
F	Y	A	N	G	D	I	I	G	D	I	R	Q	A	H	C	C	F
R	P	T	N	E	I	I	K	S	I	R	I	G	P	G	C	A	T
Y	A	T	G	E	I	I	G	D	I	R	Q	A	H	C	C	A	T
P	Y	N	N	I	R	Q	R	T	P	I	G	L	G	Q	C	A	L
T	T	R	R	I	E	D	I	R	R	A	H	C	C	T	R	P	S
T	N	T	R	T	S	I	R	I	G	P	G	Q	V	F	Y	R	T
G	D	I	T	G	D	I	R	K	A	Y	C	G	S	C	T	R	P
N	N	E	T	I	K	D	I	I	L	G	P	G	R	V	F	Y	T
A	N	E	I	R	S	I	T	R	K	A	H	C	C	T	R	A	N
N	N	T	I	I	K	S	I	F	A	P	G	Q	A	L	Y	P	T
G	N	E	I	I	G	D	I	Q	A	H	C	L	G	C	T	A	P
N	N	N	T	R	K	S	V	R	I	G	P	G	Q	C	F	Y	A
T	G	D	I	I	G	D	I	R	Q	A	H	C	C	T	R	P	N
N	E	T	R	K	S	I	R	I	G	P	G	Q	A	T	F	A	T
G	N	I	R	Q	D	T	P	I	A	H	C	C	A	L	Y	Y	N
N	R	E	D	I	R	R	A	R	G	C	T	R	P	S	T	T	T
R	T	S	I	R	I	G	P	G	Q	V	F	Y	R	T	G	D	I
T	G	D	I	R	K	A	Y	C	G	S	C	T	R	P	N	N	E
T	R	K	D	I	S	G	A	P	G	C	R	V	F	Y	P	N	T
I	K	S	I	T	F	A	P	G	Q	A	L	Y	A	T	G	E	I
I	G	D	I	R	Q	A	H	C	L	G	N	I	S	R	A	K	W
N	N	T	L	K	Q	I	D	S	K	L	R	E	Q	F	G	N	N
K	T	I	I	F	K	Q	S	S	G	G	D	P	E	I	V	T	H
S	F	N	C	G	G	E	F	F	Y	C	N	S	T	Q	L	F	N
S	D	W	F	N	S	T	W	S	T	K	G	S	N	N	T	E	G
S	V	G	I	A	M	Y	A	P	I	P	S	I	Q	I	M	W	Q
S	N	I	T	G	L	L	L	T	R	D	G	G	N	S	N	N	E
S	E	I	F	R	P	G	G	G	D	M	R	D	N	W	R	S	E
L	Y	K	Y	K	V	V	Q	I	E	P	L	G	V	A	P	T	K
A	K	R	R	V	V	T	S	S	A	V	G	I	G	A	L	F	L
G	F	L	G	A	A	G	L	S	M	V	C	T	S	M	T	L	T
V	Q	A	R	Q	L	L	S	D	I	V	Q	Q	Q	N	N	L	L
R	A	I	E	A	Q	Q	H	L	L	Q	L	T	V	W	G	I	K
Q	L	Q	A	R	I	L	A	V	E	R	Y	L	K	D	Q	Q	L
L	G	I	W	G	C	S	G	K	L	I	C	T	T	A	V	P	W
N	A	S	W	S	N	I	S	N	E	Y	I	W	N	H	M	T	W
E	E	S	Q	N	Q	Q	E	K	N	E	Q	E	L	L	E	L	D
K	W	A	S	L	W	N	W	F	N	I	T	N	W	L	W	Y	I
K	L	F	I	M	I	V	G	G	L	V	G	L	R	I	V	F	A
V	L	S	I	V	N	R	V	R	Q	G	Y	S	P	L	S	F	Q
T	H	L	P	I	P	R	G	P	D	R	P	E	G	I	E	E	E
G	I	E	R	D	D	R	R	S	I	R	L	V	N	G	S	L	A
L	L	L	L	I	V	T	R	I	V	E	L	L	G	R	R	L	W
E	A	L	K	Y	W	W	N	L	L	Q	Y	W	S	Q	E	L	K
N	S	A	V	N	L	L	N	A	T	A	I	A	V	A	E	*	

FIGURE 54B

[illegible]

**DNA sequence of HIV-1 (strain BH10) Protease (PI, nt 1407-1907) [SEQ ID NO: 56]:**

atgttcttagggaagatctggccttcctacaagggaaggccagggaattttcttcagagcagaccagagcca  
acagccccaccatttcttcagagcagaccagagccaacagccccaccagaagagagcttcaggtctggggt  
agagacaacaactccccctcagaagcaggagccgatagacaagggaactgtatcctttaacttccctcagatc  
actctttggcaacgacccctcgtcacaataaagataggggggcaactaaagggaagctctattagatacagga  
gcagatgatacagtattagaagaaatgagtttgcagggaagatggaaacaaaaaatgatagggggaattgg  
aggttttatcaaagtaagacagtatgatcagatactcatagaaatctgtggacataaagctataggtacagtatt  
agtaggacctacacctgtcaacataattggaagaaatctgttgactcagattggttgcactttaaattttaa

**FIGURE 55B**

**Amino acid sequence of HIV-1 (strain BH10) Protease (PI) [SEQ ID NO: 57]:**

[illegible]

## FIGURE 56A

DNA sequence of HIV-1 (strain BH10) Gag-PI [SEQ ID NO: 58]:

Atggggtgcgagagcgtcagttattaagcgggggagaattagatcgatgggaaaaaattcg  
gttaaggccagggggaaagaaaaaatataaattaaaacatatagtatgggcaagcaggg  
agctagaacgattcgcagttaatcctggcctgttagaaacatcagaaggctgtagacaa  
atactgggacagctacaaccatcccttcagacaggatcagaagaacttagatcattata  
taatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaagg  
aagcttttagacaagatagaggaagagcaaaaacaaaagtaagaaaaaagcacagcaagca  
gcagctgacacaggacacagcagtcaggtcagccaaaattaccctatagtgacagaacat  
ccaggggcaaattggtacatcaggccatatcacctagaactttaaatgcatgggtaaaag  
tagtagaagagaaggctttcagcccagaagtaatacccatgttttcagcattatcagaa  
ggagccaccccacaagattttaaacaccatgctaaacacagtggggggacatcaagcagc  
catgcaaattgttaaaagagaccatcaatgaggaagctgcagaatgggatagagtacatc  
cagtgcatgcagggcctattgcaccaggccagatgagagaaccaaggggaagtacata  
gcaggaactactagtacccttcaggaacaaataggatggatgacaaataatccacctat  
cccagtaggagaaaattttataaaagatggataatcctgggattaaataaaatagtaagaa  
tgtatagccctaccagcattctggacataagacaaggaccaaagaaccttttagagac  
tatgtagaccggttctataaaactctaagagccgagcaagcttcacaggaggtaaaaaa  
ttggatgacagaaaccttggttggtccaaaatgcgaaccagattgtaagactattttaa  
aagcattgggaccagcggctacactagaagaaatgatgacagcatgtcagggagtagga  
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tggaatgtggaaaggaaggacaccaaattgaaagattgtactgagagacaggctaattt  
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ccagagccaacagccccaccattttcttcagagcagaccagagccaacagccccaccaga  
agagagcttcaggtctggggtagagacaacaactccccctcagaagcaggagccgatag  
acaaggaactgtatcctttaacttccctcagatcactctttggcaacgaccctcgta  
caataaagataggggggcaactaaaggaagctctattagatacaggagcagatgataca  
gtattagaagaaatgagtttgccaggaagatggaaacaaaaatgatagggggaattgg  
aggttttatcaaagtaagacagtatgatcagatactcatagaaatctgtggacataaag  
ctataggtacagtattagtaggacctacacctgtcaacataattggaagaaatctgttg  
actcagattggttgcacttttaatttttaa

## **FIGURE 57**

### **Primers for multi-clade V3 loops:**

Clade A: (1). forward primer A888F5 [SEQ ID NO: 60]:

5'-aaa tca acc gga att gaa ttc cct cgg gtg tac cag acc taa caa caa tac-3'  
EcoRI    Aval

(2). reverse primer A-CR3 [SEQ ID NO: 61]:

5'-att gtt ggg tct cgt aca aca atg tgc ttg tct tat atc ccc-3'

Clade C: (3). forward primer A-CF5 [SEQ ID NO: 62]:

5'-ggg gat ata aga caa gca cat tgt acg aga ccc aac aat ac-3'

(4). reverse primer C980R3 [SEQ ID NO: 63]:

5'-gtt gta ggg cct tgt gca aca atg tgc ttg tct tat atc -3'

Clade D: (5). forward primer D888F5 [SEQ ID NO: 64]:

5'-gat ata aga caa gca cat tgt tgc aca agg ccc tac aac-3'

(6). reverse primer D-ER3 [SEQ ID NO: 65]:

5'-ggg gga ggg tct ggt aca aca atg tgc tct tct tat -3'

Clade E: (7). forward primer D-EF5 [SEQ ID NO: 66]:

5' -ata aga aga gca cat tgt tgt acc aga ccc tcc acc-3'

(8). reverse primer E998R3 [SEQ ID NO: 67]:

5'-gta ttg ttg ttg ggt ctt gta caa caa tat gct ttt ctt ata tct cc-3'

Clade F: (9). forward primer F888F5 [SEQ ID NO: 68]:

5'-gga gat ata aga aaa gca tat tgt tgt aca aga ccc aac aac aat ac-3'

(10). reverse primer F-GR3 [SEQ ID NO: 69]:

5'-gtt att agg tct ggt aca aca atg tgc ctt tct gat gtc-3'

Clade G: (11). forward primer F-GF5 [SEQ ID NO: 70]:

5'-gac atc aga aag gca cat tgt tgt acc aga cct aat aac-3'

(12). reverse primer G989R3 [SEQ ID NO: 71]:

5'-aat aaa cta gtc tag acc ccc gag tct aga aca atg tgc ttg tct tat atc tcc-3'  
Aval    XbaI